

10/018009

SEQUENCE LISTING

JC07 Rec'd PCT/PTO 14 DEC 2001

<110> DSM N.V.

<120> Genes encoding enzymes in the biosynthetis of pimaricin and applications thereof

<130> S-2959

<140>

<141>

<160> 14

<170> PatentIn Ver. 2.1

<210> 1

<211> 5544

<212> DNA

<213> Streptomyces natalensis

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Ala	Val	Glu	Ser	Ala	Pro	Asp	Ala	Val	Ala	Leu	Val	Asp	Gly	Thr	Val	
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cct	gga	cct	ggg	cgc	atg	tgg	cgc	gca	gac	gtc	gat	gct	ggc	cgc	192	
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Asp Gly Trp Leu Arg Thr Gly Asp Leu Ala Thr Val Asp Ala Asp Gly	
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Arg Tyr Gly Gly Ala Ala Val Pro Phe Pro Pro Asp Lys Asp Phe Phe	
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Ser Pro Asp Lys Asp Phe Arg Gln Leu Gly Leu Asp Ser Ile Gly Ala	
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Val Arg Leu Arg Asn Leu Leu Arg Glu Glu Thr Gly Leu Pro Leu Pro	
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Ala Asp Gly Ala Asp Pro Val Ala Ile Val Gly Met Ala Cys Arg Leu					
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Phe Gly Leu Ser Asp Gln Glu Ala Thr Ala Thr Asp Pro Gln Gln Arg					
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Ser Met Leu Ile Thr Gly Thr Ala Gly Ser Ala Val Ser Gly Arg Ile					
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Ala Tyr Thr Tyr Gly Leu Glu Gly Pro Ala Leu Thr Val Asp Thr Ala					
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Ser Gly Glu Thr Asp Leu Ala Leu Ala Gly Gly Val Thr Val Met Ala					
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885		890		895
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cgc aac gga cac cgt gtc ctg gcg ctc gta cgg ggc tcc gcc gtg aat Arg Asn Gly His Arg Val Leu Ala Leu Val Arg Gly Ser Ala Val Asn				2784
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cag gac ggc gcc tcc aac ggg ctc acc gcg ccc agc gga ccc gca cag Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala Pro Ser Gly Pro Ala Gln				2832
930		935		940
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980		985		990
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1010		1015		1020
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				1120

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His Arg Ala Val Val Ser Gly Ser Asp Arg Ala Gln Met Leu Ala Ala						
1170	1175	1180				
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Ala Lys Arg Phe Gly Leu Gly Glu Arg Thr Ala Gly Val Thr Pro Asp						
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Asp Ser Ala Pro Gly Leu Leu Ala Phe Val Phe Ser Gly Gln Gly Ser						
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Gln Arg Ser Gly Met Gly Arg Ala Ala Ala Glu Ala Phe Pro Val Phe						
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Gly Arg Ala Leu Gly Glu Val Cys Ala Ala Leu Asp Pro Leu Leu Thr						
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1845

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<212> PRT

<213> Streptomyces natalensis

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Leu	Pro	Asn	Cys	Gly	Arg	Phe	Pro	Thr	Leu	His	Leu	Ala	Val	Ala	Ala
												85	90	95	

Val	Gly	Ala	Val	Leu	Leu	Pro	Ile	His	Gln	Gly	Thr	Pro	Leu	Pro	Glu
												100	105	110	

Val	Asp	Ala	Leu	Leu	Thr	Arg	Ala	Glu	Pro	Ala	Leu	Leu	Val	Leu	Ser
												115	120	125	

Ala	Ala	Gly	Ser	Asp	Gly	Leu	Ala	Thr	Ala	Arg	Ser	Leu	Leu	Glu	Ser
												130	135	140	

Val	Pro	Ser	Leu	Arg	Gly	Val	Leu	Leu	Ala	Gly	Ala	Ser	Gly	Asp	Gly
												145	150	155	160

Glu	Ser	Gly	Ser	Val	Gly	Gly	Glu	Ser	Gly	Ser	Gly	Arg	Arg	Ser	
												165	170	175	

Leu	Asp	Gly	Leu	Leu	Ala	Gly	Trp	Ala	Gly	Ser	Gly	Pro	Arg	Pro	Val
												180	185	190	

Asp	Val	Thr	Pro	Asp	Met	Pro	Leu	Val	Leu	Val	Pro	Ser	Ser	Gly	Thr
												195	200	205	

Val	Ser	Ala	Arg	Pro	Lys	Leu	Cys	Val	His	Ser	His	Asp	Gly	Leu	Leu
												210	215	220	

Ser	Asn	Thr	Ala	Ala	Val	Thr	Ala	Glu	Ala	Ala	Asp	Ala	Phe	Asp	Gly
												225	230	235	240

Pro	Val	Leu	Thr	Ala	Cys	Pro	Met	Thr	His	Leu	Phe	Gly	Leu	Gln	Ser
												245	250	255	

Leu	His	Ala	Ala	Leu	Phe	Ala	Ala	Cys	Thr	Gln	Val	Leu	Leu	Thr	Gly
												260	265	270	

Trp	Asp	Val	Asp	Arg	Phe	Leu	Glu	Gln	Ala	Arg	Glu	His	Gly	Pro	Arg
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

275

280

285

Val Val Phe Ala Val Pro Ala Gln Leu Arg Asp Val Val Thr Arg Leu
 290 295 300

Ala Arg Thr Gly Glu Pro Ala Gly Phe Thr Pro Tyr Gln Val Arg Thr
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Ala Gly Ala Ala Val Ala Pro Ala Leu Ala Val Arg Val Arg Ala Val
 325 330 335

Leu Asp Cys Glu Leu Val Val Trp Gly Met Ser Glu Ile Gly Thr
 340 345 350

Gly Thr Arg Thr Arg Ala His His Pro Asp Gly Cys Val Gly Glu Pro
 355 360 365

Val Ser Gly Val Asp Val Arg Val Val Asp Glu His Gly Gln Glu Cys
 370 375 380

Ala Ala Asp Glu Arg Gly Glu Leu Gln Tyr Arg Gly Pro Gly Leu Phe
 385 390 395 400

Arg Gly Tyr Phe Arg Glu Pro Glu Leu Thr Arg Ser Ala Leu Thr Asp
 405 410 415

Asp Gly Trp Leu Arg Thr Gly Asp Leu Ala Thr Val Asp Ala Asp Gly
 420 425 430

Val Val Val Leu His Gly Arg Ala Ala Glu Leu Ile Asn Thr Gly Gly
 435 440 445

Arg Lys Phe Ser Ala Gly Glu Val Glu Gly Leu Leu Ser Gly Phe Thr
 450 455 460

Asp Leu Gly Pro Leu Ala Val Val Gly Ala Pro Asp Asp Arg Leu Gly
 465 470 475 480

Glu Tyr Pro Cys Leu Val Val Thr Asp His Ala Asp Gly Thr Ile Gly
 485 490 495

Leu Ser Glu Val Thr Ala Phe Leu Arg Arg Leu Gly Leu Ala Asp His
 500 505 510

Lys Ile Pro Leu Glu Leu Val Thr Val Arg Glu Leu Pro Phe Ser Pro
 515 520 525

Ala Gly Lys Leu Asp Arg Gly Ala Leu Lys Arg Leu Leu Ala Asn Leu
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Ala Glu Val Ser Val Pro Ala Arg Leu Gly Ala Val Pro Pro Tyr Thr
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Ala Glu Glu Ala Leu Asp Leu Val Arg Asp Cys Val Gly Arg Val Leu
 565 570 575

Arg Tyr Gly Gly Ala Ala Val Pro Phe Pro Pro Asp Lys Asp Phe Phe
 580 585 590

Ser Pro Asp Lys Asp Phe Arg Gln Leu Gly Leu Asp Ser Ile Gly Ala
 595 600 605

Val Arg Leu Arg Asn Leu Leu Arg Glu Glu Thr Gly Leu Pro Leu Pro
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 Ala Thr Leu Ala Phe Asp Ser Pro Thr Pro Arg Ala Val Ala Arg Val
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 Leu Ala Glu Gln Glu Glu Pro Ser Gln Asp Glu Pro Arg Glu Asn Pro
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 Ala Asp Gly Ala Asp Pro Val Ala Ile Val Gly Met Ala Cys Arg Leu
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 Pro Gly Gly Ala Asp Ser Pro Asp Ala Leu Trp Glu Leu Leu Ala Asp
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 Gly Thr Asp Ala Met Ser Pro Phe Pro Thr Asp Arg Gly Trp Asp Leu
 690 695 700
 Asp Arg Leu Phe Asp Glu Asp Ala Asp Arg Pro Gly Thr Ser Tyr Ala
 705 710 715 720
 Arg Glu Gly Gly Phe Leu His Asp Ala Gly Asp Phe Asp Ala Gly Phe
 725 730 735
 Phe Gly Leu Ser Asp Gln Glu Ala Thr Ala Thr Asp Pro Gln Gln Arg
 740 745 750
 Leu Leu Leu Glu Ala Ala Trp Glu Thr Phe Glu Arg Ala Gly Ile Asp
 755 760 765
 Pro Gln Ser Leu Arg Gly Ser Arg Thr Gly Val Phe Thr Gly Ala Met
 770 775 780
 Asp Arg Gly Tyr Gly Thr Ser Ala Ser Ala Ala Pro Ser Ala Trp Glu
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 Ser Met Leu Ile Thr Gly Thr Ala Gly Ser Ala Val Ser Gly Arg Ile
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 Ala Tyr Thr Tyr Gly Leu Glu Gly Pro Ala Leu Thr Val Asp Thr Ala
 820 825 830
 Ser Ser Ser Leu Val Ala Leu His Leu Ala Cys Arg Ser Leu Arg
 835 840 845
 Ser Gly Glu Thr Asp Leu Ala Leu Ala Gly Gly Val Thr Val Met Ala
 850 855 860
 Thr Pro Ala Pro Phe Ala His Phe Ser Arg Leu Arg Ala Leu Ser Pro
 865 870 875 880
 Asp Ser Arg Ser Met Ala Tyr Ala Asp Ala Ala Asn Gly Ser Ala Trp
 885 890 895
 Ser Glu Gly Ala Gly Leu Leu Leu Leu Glu Arg Leu Ser Asp Ala Arg
 900 905 910
 Arg Asn Gly His Arg Val Leu Ala Leu Val Arg Gly Ser Ala Val Asn
 915 920 925

Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala Pro Ser Gly Pro Ala Gln
 930 935 940

Gln Arg Val Ile Arg Gln Ala Leu Ala Asp Ala Gly Leu Thr Pro Gln
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Asp Val Asp Ala Val Glu Gly His Gly Thr Gly Thr Pro Leu Gly Asp
 965 970 975

Pro Ile Glu Ala Gln Ala Leu Leu Ala Thr Tyr Gly Gln Gln Arg Pro
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Val Glu Arg Pro Leu Trp Leu Gly Ser Val Lys Ser Asn Phe Gly His
 995 1000 1005

Thr Gln Ala Ala Ala Gly Val Val Gly Val Ile Lys Thr Val Leu Ala
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Leu Arg His Gly Val Leu Pro Gln Thr Leu His Val Asp Ala Pro Ser
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Ala Lys Val Asp Trp Ser Ala Gly Ser Val Arg Leu Leu Thr Glu Ala
 1045 1050 1055

Arg Pro Trp Pro Arg Glu Ser Gly Arg Thr Arg Arg Ala Gly Val Ser
 1060 1065 1070

Ser Phe Gly Leu Thr Gly Thr Asn Ala His Val Ile Leu Glu Glu Ala
 1075 1080 1085

Pro Gly Glu Ala Ala Ala Gly Ala Arg Ala Glu Val Pro Glu Glu Ala
 1090 1095 1100

Arg Cys Ala Ser Ser Pro Ala Arg Leu Pro Glu Pro Pro Gly Asp Ala
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 1125 1130 1135

Gln Ala Leu Arg Leu Ala Asp Gln Val Ala Ala Asp Pro Gly Leu Arg
 1140 1145 1150

Ala Gln Asp Val Ala His Ala Leu Ala Thr Ser Arg Thr Leu His Arg
 1155 1160 1165

His Arg Ala Val Val Ser Gly Ser Asp Arg Ala Gln Met Leu Ala Ala
 1170 1175 1180

Ala Lys Arg Phe Gly Leu Gly Glu Arg Thr Ala Gly Val Thr Pro Asp
 185 1190 1195 1200

Asp Ser Ala Pro Gly Leu Leu Ala Phe Val Phe Ser Gly Gln Gly Ser
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Gln Arg Ser Gly Met Gly Arg Ala Ala Ala Glu Ala Phe Pro Val Phe
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Gly Arg Ala Leu Gly Glu Val Cys Ala Ala Leu Asp Pro Leu Leu Thr
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Arg Pro Leu Thr Ser Val Met Trp Ala Ala Pro Gly Ser Glu Glu Ala

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Ala Arg Leu Asp Asp Thr Thr Tyr Thr Gln Pro Ala Leu Phe Ala Val			
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Gln Val Ala Leu Tyr Arg Leu Phe Glu Ser Trp Gly Val Val Pro Asp			
1285	1290	1295	
Gln Leu Val Gly His Ser Val Gly Glu Ile Ser Ala Ala His Val Ala			
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Gly Val Leu Gly Leu Arg Asp Ala Cys Thr Leu Val Ala Ala Arg Ser			
1315	1320	1325	
Arg Leu Met Gly Ala Leu Pro Pro Gly Gly Ala Met Val Ala Val Arg			
1330	1335	1340	
Ile Thr Glu Pro Glu Val Thr Pro Trp Leu Ala Glu Leu Thr Asp Glu			
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Val Ser Ile Ala Ala Val Asn Gly Pro His Ser Leu Val Leu Ala Gly			
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Ala Glu Ala Pro Leu Val Ala Leu Thr Asp Arg Leu Ala Ala Ala Gly			
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His Lys Thr Arg Arg Leu Met Val Ser Thr Ala Pro His Ser Pro Leu			
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Met Asp Pro Met Leu Glu Glu Phe Arg Ala Val Val Arg Thr Leu Ser			
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Tyr Ala Ala Pro Ala Val Pro Leu Val Ser Thr Val Thr Gly Arg Pro			
425	1430	1435	1440
Leu Thr Gly Glu Glu Ala Arg Asp Pro Asp His Trp Val Arg His Val			
1445	1450	1455	8
Arg Gln Ser Val Arg Phe Lys Asp Ala Ile Gly Arg Leu Arg Asp Glu			
1460	1465	1470	
Arg Val Thr Gly Phe Leu Glu Leu Gly Ala Glu Pro Ala Leu Thr Pro			
1475	1480	1485	
Met Ile Asp Glu Cys Leu Glu Ser Ala Asp Gly Gln Pro Gly Thr Ala			
1490	1495	1500	
Leu Val Pro Ser Leu Arg Ala Gly Val Pro Glu Arg Asp Ala Leu Leu			
505	1510	1515	1520
Thr Ala Val Ala Arg Val His Ala Gln Gly Val Pro Val Asp Trp Asp			
1525	1530	1535	
Ala Val Leu Pro Gly Ala Glu Ala Ser Val Thr Val Arg Gly Leu Pro			
1540	1545	1550	
Ala Ala Asp Arg Gln Trp Phe Arg Phe Val Pro Asp Gln Gly Ala Pro			
1555	1560	1565	
Leu Thr Leu Ala Asp Arg Ser Leu His Leu Glu Gly Ala Ala His Leu			
1570	1575	1580	

Arg Asp Val Gly Gly Cys Arg Thr Ala Asp Gly Arg Trp Val Lys Met
 585 1590 1595 1600

 Gly Val Leu Tyr Arg Thr Asn Asn Leu His Ala Leu Thr Asp Ala Asp
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 Leu Ala Lys Leu Gln Arg Leu Gly Ile Arg Thr Asp Phe Asp Leu Arg
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 Met Pro Gly Glu Arg Ala Lys Ala Pro Asn Arg Val Pro Thr Gly Ala
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 Arg Tyr Ile Val Ala Asp Ala Phe Asp Ala His Leu Arg Asp Gly Leu
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 Ser Leu Ser Glu Arg Asp Leu Glu Arg Leu Arg Glu Ala Arg Leu Ser
 665 1670 1675 1680

 Gly Leu Asp Glu Ala Glu Gln His Ala Leu Val Leu Ala Leu Val Leu
 1685 1690 1695

 Ala Glu Thr Ser Ala Val Leu Gly Gly Gln Glu Thr Pro Gly Glu Glu
 1700 1705 1710

 Pro His Gly Glu Glu Gly His Arg Thr Phe Lys Glu Met Gly Ile Asn
 1715 1720 1725

 Ser Leu Asn Ala Val Glu Leu Arg Asn Arg Leu Ile Ala Ala Thr Asp
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 Leu Arg Leu Pro Ala Thr Leu Val Tyr Asp Tyr Pro Thr Pro Lys Ala
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 Val Val Arg Leu Val Arg Glu Arg Leu Ala Arg Pro Ala Ser Pro Ala
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 Arg Asp Val Ala Ser Val Val Ala Glu Leu Glu Ser Leu Leu Thr Ala
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 Gly Ala Glu Val Ser Glu Glu Thr Ala Ala Arg Leu Lys Ala Val Thr
 1795 1800 1805

 Ala Val Ser Thr Gly Thr Thr Gly Ser Gly Thr Gly Ala Gly
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 Arg Leu Met Asp Ala Glu Ser
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1			5			10					15						
gac	ctt	cac	gag	act	cgt	cag	caa	ttg	gac	gag	acc	gag	gag	cgc	aag	cag	96
Asp	Leu	His	Glu	Thr	Arg	Gln	Gln	Leu	Asp	Glu	Thr	Glu	Ala	Lys	Gln		
20			25								30						
cga	gag	ccc	ctc	gag	atc	gtg	tcg	atg	gcc	tgc	cgc	ttc	ccc	ggc	ggc	144	
Arg	Glu	Pro	Leu	Ala	Ile	Val	Ser	Met	Ala	Cys	Arg	Phe	Pro	Gly	Gly		
35			40							45							
gtc	cgt	tcg	ccc	gag	gag	ctg	tgg	gag	ctg	ctg	cgc	gac	ggc	gtc	gac	192	
Val	Arg	Ser	Pro	Glu	Glu	Leu	Trp	Glu	Leu	Leu	Arg	Asp	Gly	Val	Asp		
50			55							60							
gcg	gtt	tcc	tcc	tcc	ccc	cgt	aac	cgc	ggc	tgg	gac	ctg	gac	gag	ctc	240	
Ala	Val	Ser	Ser	Phe	Pro	Arg	Asn	Arg	Gly	Trp	Asp	Leu	Asp	Ala	Leu		
65			70							75			80				
tac	cac	tcc	gac	ccg	gcc	cac	cag	ggc	acc	agc	tat	gcg	cgc	gag	ggc	288	
Tyr	His	Ser	Asp	Pro	Ala	His	Gln	Gly	Thr	Ser	Tyr	Ala	Arg	Glu	Gly		
85			90							95							
gga	ttc	ctg	cat	gac	gag	ttc	gac	ccc	ggc	ttc	ttc	ggg	atc	336			
Gly	Phe	Leu	His	Asp	Ala	Gly	Glu	Phe	Asp	Pro	Gly	Phe	Phe	Gly	Ile		
100			105							110							
tcc	ccg	cgc	gag	gag	ctc	gcc	atg	gac	ccc	cag	cag	cg	ctg	ctg	ctg	384	
Ser	Pro	Arg	Glu	Ala	Leu	Ala	Met	Asp	Pro	Gln	Gln	Arg	Leu	Leu	Leu		
115			120							125							
gag	acc	gca	tgg	gaa	gcc	gtc	gag	cg	gcc	gg	atc	gac	ccg	gag	tcc	432	
Glu	Thr	Ala	Trp	Glu	Ala	Val	Glu	Arg	Ala	Gly	Ile	Asp	Pro	Glu	Ser		
130			135							140							
ctc	gag	ggc	agc	cga	acg	gg	gt	gt	ttt	gtc	ggc	acc	gg	cac	gga	480	
Leu	Ala	Gly	Ser	Arg	Thr	Gly	Val	Phe	Val	Gly	Thr	Gly	His	Gly	Gly		
145			150							155			160				
tac	gac	gcc	gag	ggc	cga	cg	cgt	gtc	gac	gag	gtc	ggc	gg	cac	tt	528	
Tyr	Asp	Ala	Glu	Gly	Arg	Arg	Ala	Asp	Glu	Val	Gly	Gly	His	Leu			
165			170							175							
ctg	acg	ggc	aat	cac	atc	agc	atc	gcc	tcc	ggc	cg	att	tcg	tat	gtc	576	
Leu	Thr	Gly	Asn	His	Ile	Ser	Ile	Ala	Ser	Gly	Arg	Ile	Ser	Tyr	Val		
180			185							190							
ctg	ggg	ctg	gaa	ggc	cct	gcc	ctg	acc	gtg	gac	acg	gcc	tgc	tcc	tcc	624	
Leu	Gly	Leu	Glu	Gly	Pro	Ala	Leu	Thr	Val	Asp	Thr	Ala	Cys	Ser	Ser		
195			200							205							
tcg	ctg	gtc	gcc	ctg	cat	ctg	gag	atg	cac	gag	gtc	cg	cgc	gac	gaa	672	
Ser	Leu	Val	Ala	Leu	His	Leu	Ala	Met	His	Ala	Leu	Arg	Arg	Asp	Glu		
210			215							220							
tgc	gcc	atg	gcc	ctg	gtg	ggc	ggc	gag	gtg	atg	tcc	acg	ccg	cag	720		
Cys	Ala	Met	Ala	Leu	Gly	Gly	Ala	Thr	Val	Met	Ser	Thr	Pro	Gln			
225			230							235			240				

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Met Phe Val Glu Phe Ser Arg Gln Arg Gly Leu Ala Pro Asp Gly Arg	
245 250 255	
tgc aag ccg ttc gcg gcc gcc gac ggc acc ggc tgg agc gag ggt	816
Cys Lys Pro Phe Ala Ala Ala Asp Gly Thr Gly Trp Ser Glu Gly	
260 265 270	
gtc gga ctg ctg ctc gtc gag cgg ctc agt gac gcc gta cgc aac ggc	864
Val Gly Leu Leu Val Glu Arg Leu Ser Asp Ala Val Arg Asn Gly	
275 280 285	
tat ccc gtc ctc gcc gtg ctg aag ggc tcg gcc gtc aac cag gac ggc	912
Tyr Pro Val Leu Ala Val Leu Lys Gly Ser Ala Val Asn Gln Asp Gly	
290 295 300	
gcg tcc aac ggc ctg acc gcc ccc aac ggc ccc tcg cag caa cgc gtc	960
Ala Ser Asn Gly Leu Thr Ala Pro Asn Gly Pro Ser Gln Gln Arg Val	
305 310 315 320	
atc cgc cag gcg ctg acc ggc gcg ggc ctc gcc tcg gac atc gac	1008
Ile Arg Gln Ala Leu Thr Gly Ala Gly Leu Ala Ala Ser Asp Ile Asp	
325 330 335	
gcc gtg gag gcg cac ggc acc ggc acc acc ctc ggc gac ccc gtc gag	1056
Ala Val Glu Ala His Gly Thr Gly Thr Leu Gly Asp Pro Val Glu	
340 345 350	
gcg cac gcc ctg ctg gcc acc tac ggg cag cag cgc gcc gac cgg	1104
Ala His Ala Leu Leu Ala Thr Tyr Gly Gln Gln Arg Ala Ala Asp Arg	
355 360 365	
ccg tgc gga ctc ggc tcc atg aag tcc aac atc ggg cac acc cag gcc	1152
Pro Cys Gly Leu Gly Ser Met Lys Ser Asn Ile Gly His Thr Gln Ala	
370 375 380	
gcc gcc ggt atc gcc ggc gtg atg aaa atg gtc ctg gcg atg cgg cac	1200
Ala Ala Gly Ile Ala Gly Val Met Lys Met Val Leu Ala Met Arg His	
385 390 395 400	
ggg cac ctg ccc agg acc ctg cac ctg gac gag ccc acc ggg cac gtc	1248
Gly His Leu Pro Arg Thr Leu His Leu Asp Glu Pro Thr Gly His Val	
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gac tgg agc gag ggc aac gcc agg ctc ctc gcg gag ccc gag ccc tgg	1296
Asp Trp Ser Glu Gly Asn Ala Arg Leu Leu Ala Glu Pro Glu Pro Trp	
420 425 430	
ccg agc gcc ggc cgg ccc cgt cgc gcc gtc tcc tcc ttc ggc atc	1344
Pro Ser Ala Gly Arg Pro Arg Arg Ala Ala Val Ser Ser Phe Gly Ile	
435 440 445	
agc ggc acc aac gcc cac gtc atc ctg gag cag gcg ccc gcc cac gag	1392
Ser Gly Thr Asn Ala His Val Ile Leu Glu Gln Ala Pro Ala His Glu	
450 455 460	
gcc gaa ccg gcc ccc gaa ccg gcc cgg ccc ggc gcg ctg ccc tgg	1440
Ala Glu Pro Ala Pro Glu Pro Ala Ala Arg Pro Gly Ala Leu Pro Trp	
465 470 475 480	

atc ctg tcc gcc cgc acc gaa gcg ggc ctg cgt gcc cag gcc gac cgc	485	490	495	1488
Ile Leu Ser Ala Arg Thr Glu Ala Gly Leu Arg Ala Gln Ala Asp Arg				
ctc ggc cgc cac cta cgg gac cgc gcc gac ctc gaa ccg gcc gac gtc	500	505	510	1536
Leu Gly Arg His Leu Arg Asp Arg Ala Asp Leu Glu Pro Ala Ala Val				
gcc cat gcg ctc gcg gac acc cgg acc ctc atg gaa cac ccg cgc gta	515	520	525	1584
Ala His Ala Leu Ala Asp Thr Arg Thr Leu Met Glu His Arg Ala Val				
gtc gtc gcg ggc gac cgg gag gag ttc ctg cgc ggc ctg gac gcc ctc	530	535	540	1632
Val Val Ala Gly Asp Arg Glu Glu Phe Leu Arg Gly Leu Asp Ala Leu				
gcc gcg ggc cgc acc gcc aac ggc ctg gtc agc ggc gtc gcc gtc aag	545	550	555	1680
Ala Ala Gly Arg Thr Ala Asn Gly Leu Val Ser Gly Val Ala Val Lys				
gcc gcc agc gcg ttc ctc ttc gcc ggg cag ggc tcc cag cga ccg ggc	565	570	575	1728
Ala Ala Ser Ala Phe Leu Phe Ala Gly Gln Gly Ser Gln Arg Pro Gly				
atg ggg cgc gaa ctg cac gcc gcg cac ccc gtg ttc gcc acg gcc ttc	580	585	590	1776
Met Gly Arg Glu Leu His Ala Ala His Pro Val Phe Ala Thr Ala Phe				
gac gcg gtg tgc gcc gaa ctg gac cca cac ctg gac cgg ccg ctg cgc	595	600	605	1824
Asp Ala Val Cys Ala Glu Leu Asp Pro His Leu Asp Arg Pro Leu Arg				
gac atc gtc ttc gcc gag gaa ggc agc gcc gag gcc gcc ctg ctc gac	610	615	620	1872
Asp Ile Val Phe Ala Glu Glu Gly Ser Ala Glu Ala Ala Leu Leu Asp				
cag acc gcc tac acc cag gcc gcg ctc ttc gcc ctg gaa acc gcc ctg	625	630	635	1920
Gln Thr Ala Tyr Thr Gln Ala Ala Leu Phe Ala Leu Glu Thr Ala Leu				
ttc cgg ctc gtc gaa tcc tgg ggc gtg gca ccc cgg ttc gtc gcc gga	645	650	655	1968
Phe Arg Leu Val Glu Ser Trp Gly Val Ala Pro Arg Phe Val Ala Gly				
cac tcc atc ggc gag ctg acc gcc ccc gtc agt ggc gtg ctg acc	660	665	670	2016
His Ser Ile Gly Glu Leu Thr Ala Ala His Val Ser Gly Val Leu Thr				
ctc cac gac gcc gca cgg ctg gtc gcc gcg cgc ggc acc ctc atg cag	675	680	685	2064
Leu His Asp Ala Ala Arg Leu Val Ala Ala Arg Gly Thr Leu Met Gln				
gcg ctg ccc gca ggc ggc gcc atg gtg gcg gtc cag gcc acc gag gac	690	695	700	2112
Ala Leu Pro Ala Gly Gly Ala Met Val Ala Val Gln Ala Thr Glu Asp				
gag atc cgc gag cgt ctc gcc ggc cac gag gac cac gtc gcc ctc gcg	705	710	715	2160
Glu Ile Arg Glu Arg Leu Ala Gly His Glu Asp His Val Ala Leu Ala				
gcc gcc aac ggg ccc gat tcc acc gtc att tcg ggc gac gaa cag gcc				2208

Ala Ala Asn Gly Pro Asp Ser Thr Val Ile Ser Gly Asp Glu Gln Ala	725	730	735	
gtc acc gag atc gcg gcc cac tgg qag gca cag ggc cgc cgc acc aag				2256
Val Thr Glu Ile Ala Ala His Trp Glu Ala Gln Gly Arg Arg Thr Lys	740	745	750	
cgg ctg cgg gtc agc cac gcc ttc cac tcc ccg cac atg gac gac atg				2304
Arg Leu Arg Val Ser His Ala Phe His Ser Pro His Met Asp Asp Met	755	760	765	
ctg gag gac ttc cgg cgc gtc gcc cgc ggt ctg acc ttc cac gcc ccc				2352
Leu Glu Asp Phe Arg Arg Val Ala Arg Gly Leu Thr Phe His Ala Pro	770	775	780	
cgc atc ccc gtg gtg tcc acg gtg acc ggc gcg ctc gcc acc gaa gac				2400
Arg Ile Pro Val Val Ser Thr Val Thr Gly Ala Leu Ala Thr Glu Asp	785	790	795	800
gaa ctg cgc tcg ccc gac tac tgg gtg cgg cag gtc cgc gaa acc gtc				2448
Glu Leu Arg Ser Pro Asp Tyr Trp Val Arg Gln Val Arg Glu Thr Val	805	810	815	
cgc ttc tgt gct gcc gtg cgc acc ctt gag gcc gag ggc gtc acc acc				2496
Arg Phe Cys Ala Ala Val Arg Thr Leu Glu Ala Glu Gly Val Thr Thr	820	825	830	
ttc gtg gag atc ggc acc ggc ggc gtc ctc acc ccc atg gtc cag gac				2544
Phe Val Glu Ile Gly Thr Gly Val Leu Thr Pro Met Val Gln Asp	835	840	845	
tgt ctg acc acc ctc gaa gag ccc gtt ctc gtc cct ctg ctg cgc acc				2592
Cys Leu Thr Thr Leu Glu Pro Val Leu Val Pro Leu Leu Arg Thr	850	855	860	
ggc cgc ccc gaa acc acc gtc gct ctc acc gag ggc gtc gcc acc gcc ttc				2640
Gly Arg Pro Glu Thr Val Ala Leu Thr Glu Gly Val Ala Thr Ala Phe	865	870	875	880
gtg cac ggt gtc ccc gtc gac cgg tcc gcc ttc ccg ggc gcg ccc ggt				2688
Val His Gly Val Pro Val Asp Arg Ser Ala Phe Pro Gly Ala Pro Gly	885	890	895	
acc tcc cgc gcg gac ctg ccc acc tac gcc ttc cag cgt cag tgg tac				2736
Thr Ser Arg Ala Asp Leu Pro Thr Tyr Ala Phe Gln Arg Gln Trp Tyr	900	905	910	
tgg ctg gac ccg gcc gac cac gac gag ggg gag gcg gcc gcc gaa				2784
Trp Leu Asp Pro Ala Asp His Asp Glu Gly Glu Ala Ala Ala Glu	915	920	925	
gcg ggc gag gcc gga ttc tgg gcg gcc gtc gaa cgc gag gac ctc cag				2832
Ala Gly Glu Ala Gly Phe Trp Ala Ala Val Glu Arg Glu Asp Leu Gln	930	935	940	
gag ctg tcg gcc gtc ctg gcc atc gac ggc agc gaa gcg gac tcc ctc				2880
Glu Leu Ser Ala Val Leu Ala Ile Asp Gly Ser Glu Ala Asp Ser Leu	945	950	955	960
ggc agc ttc ctg ccc acc ctc tcc tgg cgc agg cag cgc agg acc				2928
Gly Ser Phe Leu Pro Thr Leu Ser Ser Trp Arg Arg Gln Arg Arg Thr				

965	970	975	
cag gcc gcc gcg gac cgc ttc agc tac cgc acc cac tgg gcc ccg cgc Gln Ala Ala Ala Asp Arg Phe Ser Tyr Arg Thr His Trp Ala Pro Arg 980	985	990	2976
acc gcc tcg ggc ggc ccc acc gcc acc ggg cac tgg ctc gtc gtc ctg Thr Ala Ser Gly Gly Pro Thr Ala Thr Gly His Trp Leu Val Val Leu 995	1000	1005	3024
ccc gaa ggc ggc acc gac gac ccg tgg acc gcc cgc ctc ctg gac gcg Pro Glu Gly Gly Thr Asp Asp Pro Trp Thr Ala Arg Leu Leu Asp Ala 1010	1015	1020	3072
ctg aac gac cag ggc ctg cac acc gac gta cgc gaa ctg ccc gcc gac Leu Asn Asp Gln Gly Leu His Thr Asp Val Arg Glu Leu Pro Ala Asp 1025	1030	1035	3120
cac gag ccc gac gcc tgg ggc cga cac ccc gtg gac ggc gtg ctc tgt His Glu Pro Asp Ala Trp Gly Arg His Pro Val Asp Gly Val Leu Cys 1045	1050	1055	3168
ctg ctg gca ctc gac gag cgg ccc acc cgc tcc tgc cct ccg tac cgg Leu Leu Ala Leu Asp Glu Arg Pro Thr Arg Ser Cys Pro Pro Tyr Arg 1060	1065	1070	3216
cgc ggg ctg gcc gcc acc acc aac gct gct gct gct cgc cct gag ggc gcg Arg Gly Leu Ala Ala Thr Thr Asn Ala Ala Arg Pro Glu Gly Ala 1075	1080	1085	3264
ggc atc cag gca ccg ctg tgg tgc gtg acc cgc ggc gcc gtc gcc gtc Gly Ile Gln Ala Pro Leu Trp Cys Val Thr Arg Gly Ala Val Ala Val 1090	1095	1100	3312
gac cgg cac gag gcg ctc aag agc ccc tta cag gca cag aca tgg ggc Asp Arg His Glu Ala Leu Lys Ser Pro Leu Gln Ala Gln Thr Trp Gly 1105	1110	1115	3360
ctg ggc cgg gtg gcc gcc ctg gag tcc ccg cag agc tgg ggc ggg ctc Leu Gly Arg Val Ala Ala Leu Glu Ser Pro Gln Ser Trp Gly Gly Leu 1125	1130	1135	3408
atc gac ctg ccc gac aac ctg gac gga cgg gcc gtc tcc gct ctg ctg Ile Asp Leu Pro Asp Asn Leu Asp Gly Arg Ala Val Ser Ala Leu Leu 1140	1145	1150	3456
agc acc ctc gcc ggg gag gag gac cag gtc gcc gtc cgc ccc gcc ggg Ser Thr Leu Ala Gly Glu Asp Gln Val Ala Val Arg Pro Ala Gly 1155	1160	1165	3504
gtc ttc gcc cgc ctc gaa cgg atc aca ccc ggc ggc gac acc ggc Val Phe Ala Arg Arg Leu Glu Arg Ile Thr Pro Gly Gly Asp Thr Gly 1170	1175	1180	3552
gac cgg tgg agc acc cac ggc acc gtc ctg gtc acc ggc ggc acc ggt Asp Arg Trp Ser Thr His Gly Thr Val Leu Val Thr Gly Gly Thr Gly 1185	1190	1195	3600
gcc ctc ggc gcg cac ctc gcc cac tgg ctg gcc gac gcc gga gcc gaa Ala Leu Gly Ala His Leu Ala His Trp Leu Ala Asp Ala Gly Ala Glu 1205	1210	1215	3648

cac ctc gtg ctc acc ggc cgc cgc ggc ccg cag gcc ccc ggc gca ccg	3696
His Leu Val Leu Thr Gly Arg Arg Gly Pro Gln Ala Pro Gly Ala Pro	
1220 1225 1230	
gaa ctc gcg gcc gcc ctc acc gac cgg ggc gtc aag gtc acc ctc gcc	3744
Glu Leu Ala Ala Leu Thr Asp Arg Gly Val Lys Val Thr Leu Ala	
1235 1240 1245	
gcc tgc gac gcc gcc gac cgt gat gcg ctg gcg gcc gtc ctc gcg gac	3792
Ala Cys Asp Ala Ala Asp Arg Asp Ala Leu Ala Val Leu Ala Asp	
1250 1255 1260	
atc ccg ccg cac ctg ccg ctg acc ggc gtc gtc cac gcc gcg ggc gta	3840
Ile Pro Pro His Leu Pro Leu Thr Gly Val Val His Ala Ala Gly Val	
1265 1270 1275 1280	
ctg gac gac ggc gta ctg gac gcg ctc acc ccc gag cgc ttc gag acc	3888
Leu Asp Asp Gly Val Leu Asp Ala Leu Thr Pro Glu Arg Phe Glu Thr	
1285 1290 1295	
gta ctg cgc ccc aag gcg cgg gcc gca cag aac ctg cac gaa ctc acc	3936
Val Leu Arg Pro Lys Ala Arg Ala Gln Asn Leu His Glu Leu Thr	
1300 1305 1310	
cag gac ctc gac ctg gac cac ttc gtg ctg ttc tcc tcg atc gtc ggc	3984
Gln Asp Leu Asp Leu Asp His Phe Val Leu Phe Ser Ser Ile Val Gly	
1315 1320 1325	
gtc ctg ggc aac gcc gga cag gcc aac tac gcc gcc gcc aac gcc tac	4032
Val Leu Gly Asn Ala Gly Gln Ala Asn Tyr Ala Ala Asn Ala Tyr	
1330 1335 1340	
ttg gac gcc ctc gcc gaa cac cgt ctc gcc cag ggg ctc ccg gcc acc	4080
Leu Asp Ala Leu Ala Glu His Arg Leu Ala Gln Gly Leu Pro Ala Thr	
1345 1350 1355 1360	
tcc gtg tcc tgg ggc cct ggg cag gcg gca tgg cac gac agc gac	4128
Ser Val Ser Trp Gly Pro Gly Gln Ala Ala Ala Trp His Asp Ser Asp	
1365 1370 1375	
gcc gcc gac cgg atg agc cgc gac gga ctg ctg ccc atg gcc gcg gcc	4176
Ala Ala Asp Arg Met Ser Arg Asp Gly Leu Leu Pro Met Ala Ala Ala	
1380 1385 1390	
ccg cgt cgc cgc cct gcg cca gcc ctc gcc cag ggc atg aca cag gtg	4224
Pro Arg Arg Arg Pro Ala Pro Ala Leu Ala Gln Gly Met Thr Gln Val	
1395 1400 1405	
acc gtg gcc gac atc gac tgg agc gca tac gcc ccc gcc ctg acc gcc	4272
Thr Val Ala Asp Ile Asp Trp Ser Ala Tyr Ala Pro Ala Leu Thr Ala	
1410 1415 1420	
gtc cgc ccc agc ccc ctc atc ggc gac ctg ccc gag gca cgc cgc gcg	4320
Val Arg Pro Ser Pro Leu Ile Gly Asp Leu Pro Glu Ala Arg Arg Ala	
1425 1430 1435 1440	
ctc ggc ccc gca gaa ggc ccc cgc cgg gaa cgc tcc ccc ctg cgc gac	4368
Leu Gly Pro Ala Glu Gly Pro Arg Arg Glu Arg Ser Pro Leu Arg Asp	
1445 1450 1455	

cg^g at^c gg^c g^c a^c ct^g cc^g gg^c g^a a^a g^a g^c t^c ct^g acc 4416
 Arg Ile Gly Ala Leu Pro Pro Ala Glu Gln Glu Lys Ala Phe Leu Thr
 1460 1465 1470

at^g g^tc agg g^aa g^ag g^cc g^cg agg g^ta ct^g g^ga c^ac c^cc t^cg cc^g g^ac 4464
 Met Val Arg Glu Glu Ala Ala Arg Val Leu Gly His Pro Ser Pro Asp
 1475 1480 1485

acc g^tc g^at g^cc c^aa c^gc g^cc t^tc c^gc g^ag g^gg t^tc g^ac t^cc ct^g 4512
 Thr Val Asp Ala Gln Arg Ala Phe Arg Glu Gln Gly Phe Asp Ser Leu
 1490 1495 1500

at^g g^cc g^tc g^ac ct^g c^gc a^ac c^gg c^tc t^cc g^cc ac^g g^gc ct^g c^gg 4560
 Met Ala Val Asp Leu Arg Asn Arg Leu Ser Ala Ala Thr Gly Leu Arg
 1505 1510 1515 1520

ct^g c^cc g^cc acc ct^g ct^g t^tc g^ac c^ac c^cc acc c^cc c^tt g^cc g^cc 4608
 Leu Pro Ala Thr Leu Leu Phe Asp His Pro Thr Pro Leu Ala Ala Ala
 1525 1530 1535

g^cc t^gc ct^g c^gc t^cc g^aa g^tc ct^g g^cc g^ca g^ga c^cc g^cc ac^g g^tc 4656
 Ala Cys Leu Arg Ser Glu Val Leu Gly Ala Ala Gly Pro Ala Thr Val
 1540 1545 1550

g^tt c^ag g^ca t^cg acc g^cc g^cc c^tc g^ac g^aa c^cg g^tg g^cc at^c at^c g^cc 4704
 Val Gln Ala Ser Thr Ala Ala Leu Asp Glu Pro Val Ala Ile Ile Gly
 1555 1560 1565

at^g g^cc t^gc c^gc t^tc c^cc g^gc g^tg c^ac t^ca c^cc g^ag g^cc ct^g t^gg 4752
 Met Ala Cys Arg Phe Pro Gly Gly Val His Ser Pro Glu Ala Leu Trp
 1570 1575 1580

cg^g ct^g ct^g g^cc g^ag g^gc g^gc g^ac g^cc at^c acc c^cc at^g c^cc g^cc g^ac 4800
 Arg Leu Leu Ala Glu Gly Gly Asp Ala Ile Thr Pro Met Pro Ala Asp
 1585 1590 1595 1600

cg^g g^gc t^gg g^ac ct^g g^ac c^gg c^tc t^ac c^ac c^cc g^ac c^ac c^cg 4848
 Arg Gly Trp Asp Leu Asp Arg Leu Tyr His Pro Asp Pro Asp His Gln
 1605 1610 1615

g^gc acc a^gc tac g^cc c^gc g^gc g^gc t^tc ct^g g^ac g^gc g^cc g^cc g^ac 4896
 Gly Thr Ser Tyr Ala Arg Gly Gly Phe Leu Asp Gly Ala Ala Asp
 1620 1625 1630

t^tc g^ac g^cg g^ac t^tc g^gc at^c t^cg c^gc g^ag g^cc c^tc g^cc at^g 4944
 Phe Asp Ala Asp Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala Met
 1635 1640 1645

g^ac c^gc c^ag c^ag c^gg ct^g c^tc ct^g g^aa a^ca t^gg g^ag g^tg c^tc g^aa c^ag 4992
 Asp Pro Gln Gln Arg Leu Leu Leu Glu Thr Trp Glu Val Leu Glu Gln
 1650 1655 1660

g^cg g^gg at^c g^ac c^gg g^aa t^cc ct^g c^gg g^gc a^gc a^gc acc g^gt g^tc t^tc 5040
 Ala Gly Ile Asp Pro Glu Ser Leu Arg Gly Ser Ser Thr Gly Val Phe
 1665 1670 1675 1680

g^cg g^gc acc a^ac acc c^ag g^ac tac g^gc ac^g g^cc ct^g g^ac g^cg g^ca c^ag 5088
 Ala Gly Thr Asn Thr Gln Asp Tyr Gly Thr Ala Leu Asp Ala Ala Gln
 1685 1690 1695

g^ac g^aa g^cc g^gc g^ga c^ac c^gg c^tc acc g^gc a^ac g^cg at^g a^gc g^tc g^tc 5136

Asp Glu Ala Gly Gly His Arg Leu Thr Gly Asn Ala Met Ser Val Val			
1700	1705	1710	
tcc ggc cgg gtc tcc tac acc ttc ggc ttc gag gga ccc gcc ctc acc			5184
Ser Gly Arg Val Ser Tyr Thr Phe Gly Phe Glu Gly Pro Ala Leu Thr			
1715	1720	1725	
gtg gac acg gcg tgc tcc tcc tcg ctg gtg gcc ctg cac atg gcc gcg			5232
Val Asp Thr Ala Cys Ser Ser Leu Val Ala Leu His Met Ala Ala			
1730	1735	1740	
cag gcg ctg cgc cag ggc gaa tgc tcc ctg gcg gtc ggc ggc ggt gtg			5280
Gln Ala Leu Arg Gln Gly Glu Cys Ser Leu Ala Val Ala Gly Gly Val			
1745	1750	1755	1760
acg gtg atg gcc acc ccg tcc tcc ttc gtg gag ttc gcc cgg cag cgc			5328
Thr Val Met Ala Thr Pro Ser Ser Phe Val Glu Phe Ala Arg Gln Arg			
1765	1770	1775	
ggg ctg gcc ccc gac ggc cgc tgc aag ccg ttc gcg gcg gcc gac			5376
Gly Leu Ala Pro Asp Gly Arg Cys Lys Pro Phe Ala Ala Ala Asp			
1780	1785	1790	
ggc acc ggc tgg agc gag ggc gtc ggc ctg ctg ctc gtg gaa cgg ctc			5424
Gly Thr Gly Trp Ser Glu Gly Val Gly Leu Leu Leu Val Glu Arg Leu			
1795	1800	1805	
agc gac gcc cgc cga aac ggc cac cag gtg ctc gcc gtc gtc cgc ggt			5472
Ser Asp Ala Arg Arg Asn Gly His Gln Val Leu Ala Val Val Arg Gly			
1810	1815	1820	
tcg gcg gtc aac cag gac ggc gcg tcc aac ggt ctg agc gca ccc agc			5520
Ser Ala Val Asn Gln Asp Gly Ala Ser Asn Gly Leu Ser Ala Pro Ser			
1825	1830	1835	1840
ggc ccg tcc cag cag cgg gtg atc cgg cag gcc ctg gcg aac gcc cgg			5568
Gly Pro Ser Gln Gln Arg Val Ile Arg Gln Ala Leu Ala Asn Ala Arg			
1845	1850	1855	
gtg gcc gcc tcc gag gtc gac gcc gtg gag gcc cac ggc acg ggc acc			5616
Val Ala Ala Ser Glu Val Asp Ala Val Glu Ala His Gly Thr Gly Thr			
1860	1865	1870	
acg ctc ggt gac ccg atc gag gcc cag gcg ctg ctg gcc acc tac ggc			5664
Thr Leu Gly Asp Pro Ile Glu Ala Gln Ala Leu Leu Ala Thr Tyr Gly			
1875	1880	1885	
cag gag cgg ccg ctg ctc ggc gcg gtg aag tcc aac ctc ggc cac			5712
Gln Glu Arg Pro Leu Leu Leu Gly Ala Val Lys Ser Asn Leu Gly His			
1890	1895	1900	
acc cag gcc gcc ggc ggt gtg gcg ggc gtg atg aag atg gtg ctg gcg			5760
Thr Gln Ala Ala Ala Gly Val Ala Gly Val Met Lys Met Val Leu Ala			
1905	1910	1915	1920
atg cgg cac ggc atg ctg ccg cgc acc ctg cac gtc gac gag ccc acc			5808
Met Arg His Gly Met Leu Pro Arg Thr Leu His Val Asp Glu Pro Thr			
1925	1930	1935	
ggg cat gtc gac tgg acc gcg ggc gcg gtc gag ctg ctc acc gag cac			5856
Gly His Val Asp Trp Thr Ala Gly Ala Val Glu Leu Leu Thr Glu His			

1940	1945	1950	
acg gac tgg ccc gag acc ggc cac ccc cg ^g cgc gcc g ^g c gtc tcc g ^g c			5904
Thr Asp Trp Pro Glu Thr Gly His Pro Arg Arg Ala Ala Val Ser Ala			
1955	1960	1965	
ttc ggc atc agc ggc acc aat g ^c g c ^a c g ^t g g ^t g c ^t g g ^a a c ^t g c ^{cc} g ^c a			5952
Phe Gly Ile Ser Gly Thr Asn Ala His Val Val Leu Glu Leu Pro Ala			
1970	1975	1980	
gcc gaa cag ccc ttg gtc gaa cag ccc tc ^g g ^c c g ^a g c ^{cc} g ^a c g ^g c			6000
Ala Glu Gln Pro Leu Val Glu Gln Pro Ser Ala Ala Glu Pro Asp Ala			
1985	1990	1995	2000
ccg gcc acc gct ccc gac cg ^g ac ^g ccc acc g ^c c tcc g ^a c g ^g g ac ^g g ^c g			6048
Pro Ala Thr Ala Pro Asp Arg Thr Pro Thr Ala Ser Asp Gly Thr Ala			
2005	2010	2015	
ccg ctg ctg ctc tcc gcc aag agc gag agc g ^c c ctg c ^g g c ^c c c ^a g g ^c g			6096
Pro Leu Leu Leu Ser Ala Lys Ser Glu Ser Ala Leu Arg Ala Gln Ala			
2020	2025	2030	
gcc c ^g g ctg cac tcc c ^a c ctg gag c ^g c g ^a c c ^{cc} g ^c g c ^t c c ^g g ac ^g			6144
Ala Arg Leu His Ser His Leu Glu Arg Asp Pro Ala Leu Arg Leu Thr			
2035	2040	2045	
gac gcc g ^c g tac ac ^g ctg at ^g ac ^g cac c ^g c ac ^g g ^c c t ^t c g ^c c c ^a c c ^g c			6192
Asp Ala Ala Tyr Thr Leu Met Thr His Arg Thr Ala Phe Ala His Arg			
2050	2055	2060	
g ^c g gcc g ^t c c ^g c g ^c c g ^c c g ^a c c ^a c g ^a a g ^c c g ^t g c ^g c g ^c c c ^t g acc			6240
Ala Ala Val Arg Ala Ala Asp His Glu Ala Ala Leu Arg Ala Leu Thr			
2065	2070	2075	2080
gcc ctg g ^c t g ^c g g ^g c gag g ^c c g ^a c c ^{cc} g ^c c g ^t g g ^a c acc g ^g c acc g ^c c			6288
Ala Leu Ala Ala Gly Glu Ala Asp Pro Ala Val Asp Thr Gly Thr Ala			
2085	2090	2095	
cac a ^c c g ^c g c ^g g g ^c c g ^t c c ^t c t ^t c g ^c c c ^a g g ^g a t ^c g c ^a a c ^g c			6336
His Thr Gly Arg Asp Ala Val Leu Phe Ser Gly Gln Gly Ser Gln Arg			
2100	2105	2110	
atc g ^g a at ^g g ^g c c ^g g gag t ^t g t ^c c g ^c c tac c ^{cc} g ^t g t ^t c g ^c a gag			6384
Ile Gly Met Gly Arg Glu Leu Ser Gly Arg Tyr Pro Val Phe Ala Glu			
2115	2120	2125	
gcc t ^t c g ^a c acc g ^t g t ^g c g ^c g g ^c c tt ^g g ^a c gag cat ctg g ^c c c ^{cc}			6432
Ala Phe Asp Thr Val Cys Ala Ala Leu Asp Glu His Leu Asp Arg Pro			
2130	2135	2140	
ctg c ^g g g ^a c g ^t g g ^t c c ^g g g ^g c gag g ^a c gag g ^g a g ^t g ctg ctg a ^a c c ^g g acc			6480
Leu Arg Asp Val Val Arg Gly Glu Asp Glu Glu Leu Leu Asn Arg Thr			
2145	2150	2155	2160
gtc tac g ^c c c ^a g g ^c g g ^g g ctg t ^t c g ^c c atc g ^a g g ^t g g ^c c c ^t c t ^t c c ^g g			6528
Val Tyr Ala Gln Ala Gly Leu Phe Ala Ile Glu Val Ala Leu Phe Arg			
2165	2170	2175	
ctc gtg gag t ^c c t ^g g g ^g c g ^t a c ^g g c ^{cc} c ^a c tac g ^t g g ^c c g ^g g cat t ^c c			6576
Leu Val Glu Ser Trp Gly Val Arg Pro His Tyr Val Ala Gly His Ser			
2180	2185	2190	

gtc ggc gag atc gcc gcc gcg cac gtc gcc ggg gtg ttc tcg ctg gcc	6624
Val Gly Glu Ile Ala Ala Ala His Val Ala Gly Val Phe Ser Leu Ala	
2195 2200 2205	
gat gcc tgc gcg ctg gtg gcg gca cgc gga cgg ctg atg cag gcg ctg	6672
Asp Ala Cys Ala Leu Val Ala Ala Arg Gly Arg Leu Met Gln Ala Leu	
2210 2215 2220	
ccc gcc ggc ggc gcg atg gcg gcg atc cgg gcg acg gag gac gaa gtc	6720
Pro Ala Gly Gly Ala Met Ala Ala Ile Arg Ala Thr Glu Asp Glu Val	
2225 2230 2235 2240	
ctc ccg cac ctg gcg gac agc gtc tcg atc gcg gcc gtc aac ggc ccg	6768
Leu Pro His Leu Ala Asp Ser Val Ser Ile Ala Ala Val Asn Gly Pro	
2245 2250 2255	
tcg tcg gtc gtc tcc ggc gcc gag cac gcc gtg ctc tcc atc gcc	6816
Ser Ser Val Val Val Ser Gly Ala Glu His Ala Val Leu Ser Ile Ala	
2260 2265 2270	
gcg cac ttc gag ggc gcg ggc cgc aag acc acc agg ctg cgg gtc tcg	6864
Ala His Phe Glu Gly Ala Gly Arg Lys Thr Thr Arg Leu Arg Val Ser	
2275 2280 2285	
cac gcc ttc cac tcc ccg ctc atg gac ccg atg ctg gcc gac ttc cgc	6912
His Ala Phe His Ser Pro Leu Met Asp Pro Met Leu Ala Asp Phe Arg	
2290 2295 2300	
gcc gtc gcc gag ggc ctg acc tac ggc gag ccg gag ctg gcc gtc gta	6960
Ala Val Ala Glu Gly Leu Thr Tyr Gly Glu Pro Glu Leu Ala Val Val	
2305 2310 2315 2320	
tcg aac gtc acc ggc caa ctc gcc acc ccg gac cag ctg cgc acc ccc	7008
Ser Asn Val Thr Gly Gln Leu Ala Thr Pro Asp Gln Leu Arg Thr Pro	
2325 2330 2335	
gag tac tgg gtg acc cat gtc cgc gcg gtg cgc ttc gcg gac ggg	7056
Glu Tyr Trp Val Thr His Val Arg Ala Ala Val Arg Phe Ala Asp Gly	
2340 2345 2350	
ata cgg gct ctg ggg gcg gaa ggg gtg acg ccg ttc ctc gaa ctc ggc	7104
Ile Arg Ala Leu Gly Ala Glu Gly Val Thr Arg Phe Leu Glu Leu Gly	
2355 2360 2365	
ccg gac ggc gtc ctg tcg gcc ttg gcc agg gag tcg gca ccg gac gac	7152
Pro Asp Gly Val Leu Ser Ala Leu Ala Arg Glu Ser Ala Pro Asp Asp	
2370 2375 2380	
gcc gtg tgc act ccc gtg ctg cgc aag gac cgc tcc gag gcg gcg acc	7200
Ala Val Cys Thr Pro Val Leu Arg Lys Asp Arg Ser Glu Ala Ala Thr	
2385 2390 2395 2400	
ctc ctc gcg gcc ctg acg cac ctg cac gta cac gga acc gag atc gac	7248
Leu Leu Ala Ala Leu Thr His Leu His Val His Gly Thr Glu Ile Asp	
2405 2410 2415	
tgg acc gcg ttc ctc gcc ggc cgc gac gcg cac gcc gtc gac ctg ccc	7296
Trp Thr Ala Phe Leu Ala Gly Arg Asp Ala His Ala Val Asp Leu Pro	
2420 2425 2430	

acg tac gcc ttc cag cac cag cgg ttc tgg ccg acc ccc gac cac acc	7344
Thr Tyr Ala Phe Gln His Gln Arg Phe Trp Pro Thr Pro Asp His Thr	
2435 2440 2445	
cgc acc ggt gac ctg ggc gcc gtc ggc ctc gaa ggc acc ggg cac ccc	7392
Arg Thr Gly Asp Leu Gly Ala Val Gly Leu Glu Ala Thr Gly His Pro	
2450 2455 2460	
ctg ctg agc gcc gcc gtg gaa ctg ccg gac ggt gag ggc ctg ttg ttc	7440
Leu Leu Ser Ala Ala Val Glu Leu Pro Asp Gly Glu Gly Leu Leu Phe	
2465 2470 2475 2480	
acc acc cgc ctc tcg ctc cag acc cac ccc tgg ctg gcc ggg cac gtc	7488
Thr Thr Arg Leu Ser Leu Gln Thr His Pro Trp Leu Ala Gly His Val	
2485 2490 2495	
gtc atg ggc tcg gtc ctg ccg ggg acg gcc ttc gcc gaa ctc gcc	7536
Val Met Gly Ser Val Leu Leu Pro Gly Thr Ala Phe Ala Glu Leu Ala	
2500 2505 2510	
ctc cgc gcc gcc gac gag gtg ggc tgc gac cgc gtc gac gaa ctg acc	7584
Leu Arg Ala Ala Asp Glu Val Gly Cys Asp Arg Val Asp Glu Leu Thr	
2515 2520 2525	
ctg gcc gcc ccg ctc gtc ctg ccc gag cac ggc ggc gta cag ctc cag	7632
Leu Ala Ala Pro Leu Val Leu Pro Glu His Gly Val Gln Leu Gln	
2530 2535 2540	
ctg cgg gtg ggc ccc gcc gac ggc tcc ggc cgc cgc acc ctg acc gcc	7680
Leu Arg Val Gly Pro Ala Asp Ala Ser Gly Arg Arg Thr Leu Thr Ala	
2545 2550 2555 2560	
cgc tcc agg gcg gag ggc gac ggc gac cgc ccg tgg gtc cag cac gcc	7728
Arg Ser Arg Ala Glu Gly Asp Gly Asp Arg Pro Trp Val Gln His Ala	
2565 2570 2575	
acc ggc gtc ctc gcg gaa ggg gag tcg acg ccc gaa ccc ggc tac gac	7776
Thr Gly Val Leu Ala Glu Gly Ser Thr Pro Glu Pro Gly Tyr Asp	
2580 2585 2590	
tcc cac acc gag tcc tgg ccg ccc gcc gac ggc gcg ccc gtc gaa ctg	7824
Phe His Thr Glu Ser Trp Pro Pro Ala Asp Ala Ala Pro Val Glu Leu	
2595 2600 2605	
tcc ggc ctc tac ccg gac ttc gcc gca cac ggt ttc gac tac ggt ccc	7872
Ser Gly Leu Tyr Pro Asp Phe Ala Ala His Gly Phe Asp Tyr Gly Pro	
2610 2615 2620	
cac ttc cag ggg ctg cgg acc gcc tgg cgc cga ggc gac gag gtc ttc	7920
His Phe Gln Gly Leu Arg Thr Ala Trp Arg Arg Gly Asp Glu Val Phe	
2625 2630 2635 2640	
gcc gag gtc gcc ctg ccc gcc gag gcc gaa ggc gag gca tcc gcg tac	7968
Ala Glu Val Ala Leu Pro Ala Glu Ala Glu Gly Glu Ala Ser Ala Tyr	
2645 2650 2655	
gga ctc cat ccg gcg ctg ctc gac gcc gcc ctg cac gtc gtc gcg ttc	8016
Gly Leu His Pro Ala Leu Leu Asp Ala Ala Leu His Val Val Ala Phe	
2660 2665 2670	
aac gga gtg gac cgc ggc gtc gtg ccg ttc tcc tgg gag agc gtc gcg	8064

Asn	Gly	Val	Asp	Arg	Gly	Val	Val	Pro	Phe	Ser	Trp	Glu	Ser	Val	Ala	
2675						2680					2685					
ctg	cac	gcc	acc	ggc	gcc	tcg	gcc	gta	cg	atc	cg	gtc	gtc	cg	cac	8112
Leu	His	Ala	Thr	Gly	Ala	Ser	Ala	Val	Arg	Ile	Arg	Val	Val	Arg	His	
2690						2695					2700					
agc	ggc	gac	acg	gtc	tcc	gtg	gat	gtc	gcc	gac	acc	ggc	gag	ccc	8160	
Ser	Gly	Asp	Thr	Val	Ser	Val	Asp	Val	Ala	Asp	Thr	Thr	Gly	Glu	Pro	
2705						2710					2715				2720	
gtc	gcc	tcc	atc	ggc	acg	ctc	gtc	ctg	cg	g	tc	gtc	tcc	gcc	gac	8208
Val	Ala	Ser	Ile	Gly	Thr	Leu	Val	Leu	Arg	Ala	Val	Ser	Ala	Asp	Gln	
2725						2730					2735					
ttg	g	gc	ggc	g	gc	g	ac	cc	ggc	g	cc	g	cg	tc	8256	
Leu	Ala	Gly	Gly	Ala	Asp	Pro	Ala	Val	Arg	Asp	Ala	Leu	Phe	Arg	Val	
2740						2745					2750					
cag	tgg	aa	cc	gt	cg	cc	cc	gg	gg	gg	gg	gg	gt	ac	8304	
Gln	Trp	Asn	Pro	Val	Arg	Leu	Pro	Pro	Ala	Gly	Ala	Ala	Val	Thr	Val	
2755						2760					2765					
gcg	ac	ct	gg	tcc	ctt	gg	gg	gca	cc	ttc	gac	gg	ta	cc	8352	
Ala	Thr	Leu	Gly	Ser	Leu	Ala	Gly	Ala	Pro	Phe	Asp	Gly	Tyr	Pro	Asp	
2770						2775					2780					
ctg	gc	tcc	ctg	gg	tcc	gg	gt	gt	gc	gg	gt	gt	ct	gt	8400	
Leu	Ala	Ser	Leu	Ala	Arg	Ser	Gly	Arg	Val	Ala	Gly	Ala	Val	Leu	Val	
2785						2790					2795				2800	
ccg	gt	gaa	gg	gg	gg	gg	gg	gg	gg	gg	gg	gg	gt	gt	8448	
Pro	Val	Glu	Ala	Gly	Ala	Gly	Glu	Val	Val	Ala	Asp	Asp	Val	Val	Gly	
2805						2810					2815					
gcg	ac	ca	gc	ac	gg	gg	gg	gg	gg	gg	gg	gg	gg	gg	8496	
Ala	Thr	His	Ala	Thr	Ala	Ala	Arg	Ala	Leu	Asp	Leu	Ala	Arg	Ser	Trp	
2820						2825					2830					
ctg	gc	gat	gac	cg	ttc	gc	gg	tc	gac	ct	gg	tc	gg	tg	8544	
Leu	Ala	Asp	Asp	Arg	Phe	Ala	Ala	Ser	Arg	Leu	Val	Phe	Val	Thr	Arg	
2835						2840					2845					
ggc	gc	gt	tg	gg	gt	gc	gg	gg	gg	gt	tg	gg	gg	gt	8592	
Gly	Ala	Val	Ser	Gly	Ala	Asp	Leu	Ala	Gly	Ala	Ala	Val	Trp	Gly	Leu	
2850						2855					2860					
gt	cg	tg	cg	tg	gag	cac	cc	gg	cg	tc	gg	tg	gt	gt	8640	
Val	Arg	Ser	Ala	Leu	Ser	Glu	His	Pro	Gly	Arg	Phe	Gly	Leu	Val	Asp	
2865						2870					2875				2880	
ctg	gat	gac	gat	gg	aa	ct	gg	ct	gt	cc	cg	tg	tg	gc	tc	8688
Leu	Asp	Asp	Asp	Ala	Glu	Leu	Ala	Leu	Val	Pro	Arg	Val	Leu	Ala	Ser	
2885						2890					2895					
gat	gag	cc	cag	ct	tg	cg	gg	gt	gg	gt	gg	gc	gc	cg	8736	
Asp	Glu	Pro	Gln	Leu	Leu	Val	Arg	Gly	Gly	Glu	Val	Leu	Ala	Ala	Arg	
2900						2905					2910					
ctg	gc	cg	gc	cg	tg	tc	ca	cg	tg	tg	gt	cc	tg	gg	8784	
Leu	Ala	Arg	Ala	Gln	Ser	Ser	His	Ala	Val	Thr	Trp	Asp	Pro	Ser	Gly	

2915	2920	2925	
acg gtg ctc gtc acc ggt ggc acg ggt ggt ctg ggc cgt gtg atg gca Thr Val Leu Val Thr Gly Gly Thr Gly Gly Leu Gly Arg Val Met Ala			8832
2930	2935	2940	
cgt cac ttg gtg gtg gaa cac ggg gta cgg aac ctg ctg ctg gtc agc Arg His Leu Val Val His Gly Val Arg Asn Leu Leu Val Ser			8880
2945	2950	2955	2960
cgc cgt ggg ccc gcc gcc gaa ggt gcc gaa gag ctg gtg acg gag ctc Arg Arg Gly Pro Ala Ala Glu Gly Ala Glu Glu Leu Val Thr Glu Leu			8928
2965	2970	2975	
cgg cac agc ggt gcc gaa gtg gcc gtc gaa gcc tgt gat gtc acc gac Arg His Ser Gly Ala Glu Val Ala Val Glu Ala Cys Asp Val Thr Asp			8976
2980	2985	2990	
gcg gcc gcc gtg gcc gac ctg gtg gcc cgg cac cgg atc agc gct gtg Ala Ala Ala Val Ala Asp Leu Val Ala Arg His Arg Ile Ser Ala Val			9024
2995	3000	3005	
gtg cat acg gcc ggt gtc ctg gat gac ggt gtg gag tcg ctg aca Val His Thr Ala Gly Val Leu Asp Asp Gly Val Val Glu Ser Leu Thr			9072
3010	3015	3020	
ccg gag cgg ctg tcg gcg gtg ttg cgt ccg aag gtg gat gcg gcc tgg Pro Glu Arg Leu Ser Ala Val Leu Arg Pro Lys Val Asp Ala Ala Trp			9120
3025	3030	3035	3040
aac ctg cac gag gcg acc agg gat ctg gac ctg gac gcg ttc gtg gtc Asn Leu His Glu Ala Thr Arg Asp Leu Asp Leu Asp Ala Phe Val Val			9168
3045	3050	3055	
ttc tcc tca gtg gca ggc acg atc ggg agc ccc ggt cag gcc aac tac Phe Ser Ser Val Ala Gly Thr Ile Gly Ser Pro Gly Gln Ala Asn Tyr			9216
3060	3065	3070	
gcg gcg ggc aac gcc ttc ctg gat gcc ctg gcc cac cac cgt cgg gcg Ala Ala Gly Asn Ala Phe Leu Asp Ala Leu Ala His His Arg Arg Ala			9264
3075	3080	3085	
gcg ggt ctt ccg gcg gcg tcg ctg gca tgg ggc ccc tgg tcc cgg gac Ala Gly Leu Pro Ala Ala Ser Leu Ala Trp Gly Pro Trp Ser Arg Asp			9312
3090	3095	3100	
ggc ggc atg acc ggc acc ctg acc gac gtc gac tcc agc gca tcg ccc Gly Gly Met Thr Gly Thr Leu Thr Asp Val Asp Ser Ser Ala Ser Pro			9360
3105	3110	3115	3120
ggc agg cat gcc cga act cac ccc cgc aca ggg cgt ggc ctc ttc gac Gly Arg His Ala Arg Thr His Pro Arg Thr Gly Arg Gly Leu Phe Asp			9408
3125	3130	3135	
gcc gcg ctg gcg gcc ggt gac gcc cac ctg ctc ccc gta cgc ttc gac Ala Ala Leu Ala Ala Gly Asp Ala His Leu Leu Pro Val Arg Phe Asp			9456
3140	3145	3150	
tgg gcg tcc ctg cgc gcc cag ggc gag gtg cca ccg ctg ttg cgc ggc Trp Ala Ser Leu Arg Ala Gln Gly Glu Val Pro Pro Leu Leu Arg Gly			9504
3155	3160	3165	

ctg atc agg acc cgt gcc cgg cgc tcg gcg gtc ggc ggc tcg gcc gcg	9552
Leu Ile Arg Thr Arg Ala Arg Arg Ser Ala Val Gly Gly Ser Ala Ala	
3170 3175 3180	
gca gcc ggc ctg gtg gga cgc ctg agc gga cgg gga acg gtg gag cgg	9600
Ala Ala Gly Leu Val Gly Arg Leu Ser Gly Arg Gly Thr Val Glu Arg	
3185 3190 3195 3200	
cgc gag gtg ctc ctg gac ctg gta cgg gcc cag atc gcg gtc gtc ctg	9648
Arg Glu Val Leu Leu Asp Leu Val Arg Ala Gln Ile Ala Val Val Leu	
3205 3210 3215	
ggc cac gcg aac ccg gag acg atc gag tcc acc cgt gtc ttc cag gac	9696
Gly His Ala Asn Pro Glu Thr Ile Glu Ser Thr Arg Val Phe Gln Asp	
3220 3225 3230	
ctc ggc ttc gac tcc acc gcg gtc gaa ctc cgc aac cgc ctc aac	9744
Leu Gly Phe Asp Ser Leu Thr Ala Val Glu Leu Arg Asn Arg Leu Asn	
3235 3240 3245	
aac gcg acc ggc ctg cgc ctt tcg gcc acc gcc gtc ttc gac tac ccc	9792
Asn Ala Thr Gly Leu Arg Leu Ser Ala Thr Ala Val Phe Asp Tyr Pro	
3250 3255 3260	
acg gcg gac gcg ctc gtc gac ttc ctg gac gag ctg ttc ggc gcg	9840
Thr Ala Asp Ala Leu Val Asp Phe Leu Leu Asp Glu Leu Phe Gly Ala	
3265 3270 3275 3280	
cag gag gag gcc gag ctg ccg gcg ccg gtg ccg tca ccg gcg ggg gcc	9888
Gln Glu Ala Glu Leu Pro Ala Pro Val Pro Ser Pro Ala Gly Ala	
3285 3290 3295	
gcc gac gac ccg gtc gtg atc gtc ggc atg agc tgc cgc tac ccg ggc	9936
Ala Asp Asp Pro Val Val Ile Val Gly Met Ser Cys Arg Tyr Pro Gly	
3300 3305 3310	
ggc gtc ggc tcg ccc gag gac ctg tgg cgc ctg gtg tcg gag ggc gtg	9984
Gly Val Gly Ser Pro Glu Asp Leu Trp Arg Leu Val Ser Glu Gly Val	
3315 3320 3325	
gac gcg gtg tcc gac ttc ccc acc gac cgt gga tgg gac gtg gag agc	10032
Asp Ala Val Ser Asp Phe Pro Thr Asp Arg Gly Trp Asp Val Glu Ser	
3330 3335 3340	
ctc tac agc ccc gac ccc gag gcg ctc ggc acc tcg tac acc cgc tcc	10080
Leu Tyr Ser Pro Asp Pro Glu Ala Leu Gly Thr Ser Tyr Thr Arg Ser	
3345 3350 3355 3360	
ggt gga ttc ctc cac gag gcg gcg gag ttc gac ccc gat ttc ttc ggg	10128
Gly Gly Phe Leu His Glu Ala Ala Glu Phe Asp Pro Asp Phe Phe Gly	
3365 3370 3375	
atg agc ccg cgc gag gcg ctg gcg acc gac gcc cag cag cgg ctg ctg	10176
Met Ser Pro Arg Glu Ala Leu Ala Thr Asp Ala Gln Gln Arg Leu Leu	
3380 3385 3390	
ctg gag acg acc tgg gag gcc atc gag cgc acg ggc atc gac ccg gcg	10224
Leu Glu Thr Thr Trp Glu Ala Ile Glu Arg Thr Gly Ile Asp Pro Ala	
3395 3400 3405	

Ser Gly Val Ala Gly Val Ile Lys Met Val Leu Ala Met Arg His Gly
 3650 3655 3660
 Val Leu Pro Arg Thr Leu His Val Asp Glu Pro Ser Ser His Val Asp
 3665 3670 3675 3680
 11040

tgg ctg cct cggtt gat gaa ccg tcg cat gtc gac
 Val Leu Pro Arg Thr Leu His Val Asp Glu Pro Ser Ser His Val Asp
 3685 3690 3695 3698
 11088

tgg agt gcc ggtt gcc gag ctg acc tcc gag gcc gag tgg ccg
 Trp Ser Ala Gly Ala Val Glu Leu Leu Thr Ser Glu Ala Glu Trp Pro
 3685 3690 3695 3698
 11088

cag ggc gag ggg ccg cgc cgc ggc gtc tcc tcc ttc ggc gtc agc
 Gln Gly Pro Arg Arg Ala Gly Val Ser Ser Phe Gly Val Ser
 3700 3705 3710 3715
 11136

ggg acg aac gcg cat gtg atc ctg gag cag ccc gga ccg gac gcg gcc
 Gly Thr Asn Ala His Val Ile Leu Glu Gln Pro Gly Pro Asp Ala Ala
 3715 3720 3725 3730
 11184

gac gcc gca ccg gac gcc acg gtg acc gat ccc ggc gcg ctg gca tgg
 Asp Ala Ala Pro Asp Ala Thr Val Thr Asp Pro Gly Ala Leu Ala Trp
 3730 3735 3740 3745
 11232

gtg ctc tcc gca ccg aac gaa gcg gcc ctg cgc tgc cag gcg gac
 Val Leu Ser Ala Arg Asn Glu Ala Ala Leu Arg Cys Gln Ala Ala Arg
 3745 3750 3755 3760
 11280

ctg ctg tcc ctg gtc ggc agt gac gcg ctg tgc gcg cgg gac atc
 Leu Leu Ser Leu Val Ala Gly Ser Asp Ala Leu Cys Ala Arg Asp Ile
 3765 3770 3775 3780
 11328

ggc cac tcg ctg gtg acc ggg cgg tcg agc ttc gcc cac cgt gcg gtg
 Gly His Ser Leu Val Thr Gly Arg Ser Ser Phe Ala His Arg Ala Val
 3780 3785 3790 3795
 11376

gtg tgg ggc cag gac cgc gac gca ctg gtg cgt gcc ctg tcc gca ctc
 Val Trp Gly Gln Asp Arg Asp Ala Leu Val Arg Ala Leu Ser Ala Leu
 3795 3800 3805 3810
 11424

gcg gtg ggc gag gcc gac gcc ggtt ctg gcg gag ggc gcg tcc ggc gcg
 Ala Val Gly Glu Ala Asp Ala Gly Leu Ala Glu Gly Ala Ser Gly Ala
 3810 3815 3820 3825
 11472

ggg agg acg gcc ttc ctg ttc ggc cag gga tca caa ccg ctg gga
 Gly Arg Thr Ala Phe Leu Phe Ser Gly Gln Gly Ser Gln Arg Leu Gly
 3825 3830 3835 3840
 11520

atg gga tgg gag ttg tac gct cgc tac ccg gtg ttc gcg gac gca ttc
 Met Gly Trp Glu Leu Tyr Ala Arg Tyr Pro Val Phe Ala Asp Ala Phe
 3845 3850 3855 3860
 11568

gac gcc gtg tgc gcg gcc ttg gac gag cac ctg gag cgc ccc ctg cgg
 Asp Ala Val Cys Ala Ala Leu Asp Glu His Leu Glu Arg Pro Leu Arg
 3860 3865 3870 3875
 11616

gac gtg gtc tgg ggc gag gac gcg gag ctg ctg aac cag acc gcg tac
 Asp Val Val Trp Gly Glu Asp Ala Glu Leu Leu Asn Gln Thr Ala Tyr
 3875 3880 3885 3890
 11664

gcc cag gcc ggg ctg ttc gcg atc gag gtg gcg ctg tac cgg ctg gcg
 Ala Gln Ala Gly Leu Phe Ala Ile Glu Val Ala Leu Tyr Arg Leu Ala
 3895 3900 3905 3910
 11712

3890	3895	3900	
gaa tcg tgg ggc atg cgc ccg gac ttc gtg gcg ggg cat tcg atc ggt Glu Ser Trp Gly Met Arg Pro Asp Phe Val Ala Gly His Ser Ile Gly			
3905	3910	3915	11760
3920			
gag gtc gcc gcg gcc cat gtg tcg ggt gtc ttc tcg ctc ccg gat gcc Glu Val Ala Ala His Val Ser Gly Val Phe Ser Leu Pro Asp Ala			
3925	3930	3935	11808
tgt gcg ctg gtg gcg gcc cga ggc cga ctg atg cag caa ctg ccc tcc Cys Ala Leu Val Ala Ala Arg Gly Arg Leu Met Gln Gln Leu Pro Ser			
3940	3945	3950	11856
ggc ggc gcg atg atg gcg atc cgg gcg acc gag gac gag gtc ctt ccg Gly Gly Ala Met Met Ala Ile Arg Ala Thr Glu Asp Glu Val Leu Pro			
3955	3960	3965	11904
cat ctg gcg gaa ggc gtc tcg ctc gcg gcg gtc aat ggc ccg tcg tcg His Leu Ala Glu Gly Val Ser Leu Ala Ala Val Asn Gly Pro Ser Ser			
3970	3975	3980	11952
gtc gtg atc tcg ggc gcc gag gac gcg gtg ctg gcc atc gcg gcg cac Val Val Ile Ser Gly Ala Glu Asp Ala Val Leu Ala Ile Ala Ala His			
3985	3990	3995	12000
4000			
ttc gcg ggg gag ggg cgc aaa acc acc cga ctg cgg gtc tcg cat gcc Phe Ala Gly Glu Gly Arg Lys Thr Thr Arg Leu Arg Val Ser His Ala			
4005	4010	4015	12048
ttc cac tcg ccg ctc atg gaa ccg atg ctg gag gaa ttc cgc gcg gtg Phe His Ser Pro Leu Met Glu Pro Met Leu Glu Glu Phe Arg Ala Val			
4020	4025	4030	12096
gtg aca ccg ctg tcc ttc ggc acg ccg acg atc ccc gtc gtc tcc aac Val Thr Arg Leu Ser Phe Gly Thr Pro Thr Ile Pro Val Val Ser Asn			
4035	4040	4045	12144
ctg acg ggc cgc ctc gcc gaa ccc gaa cag ctc gcg cac gcc gac tac Leu Thr Gly Arg Leu Ala Glu Pro Glu Gln Leu Ala His Ala Asp Tyr			
4050	4055	4060	12192
tgg gtc cgg cac gtc cgc gag gca gtg cgc ttc gcg gac ggg ata cag Trp Val Arg His Val Arg Glu Ala Val Arg Phe Ala Asp Gly Ile Gln			
4065	4070	4075	12240
4080			
gcg ctg cgg gcg gaa ggg gtg acg cgg ttc ctg gag ctc ggc ccg gac Ala Leu Arg Ala Glu Gly Val Thr Arg Phe Leu Glu Leu Gly Pro Asp			
4085	4090	4095	12288
ggg gtg ctg tcg gcg atg gcc cgc gag tcg gca tcg gac gac gcc gtg Gly Val Leu Ser Ala Met Ala Arg Glu Ser Ala Ser Asp Asp Ala Val			
4100	4105	4110	12336
4115			
ctc gcg ccc gta ctg cgc agg gac cgg ccc gag gag acg gcg ctg ctg Leu Ala Pro Val Leu Arg Arg Asp Arg Pro Glu Glu Thr Ala Leu Leu			
4120	4125		12384
ggc gcc ctg gcg cag ctg tac gtc cgg ggt gcg cac gtg gac tgg acg Gly Ala Leu Ala Gln Leu Tyr Val Arg Gly Ala His Val Asp Trp Thr			
4130	4135	4140	12432

gtg ccg ttc gcc ggt tcg ggt gcg cgc tgg gcg gat ctg ccg acg tac	12480
Val Pro Phe Ala Gly Ser Gly Ala Arg Trp Ala Asp Leu Pro Thr Tyr	
4145 4150 4155 4160	
gct ttc cag cac gag cgg ttc tgg ccg tcg ggc ggt gtc gca cgt ccg	12528
Ala Phe Gln His Glu Arg Phe Trp Pro Ser Gly Gly Val Ala Arg Pro	
4165 4170 4175	
ggc gat gtg cgg tcc gct ggc ctg ggc tcg gcc ggg cat ccg ctg ctg	12576
Gly Asp Val Arg Ser Ala Gly Leu Gly Ser Ala Gly His Pro Leu Leu	
4180 4185 4190	
ggc gct gct gtg gaa ctg gct ggc tcg ggc ctg ttg ttc acg ggc	12624
Gly Ala Ala Val Glu Leu Ala Gly Ser Gly Gly Leu Leu Phe Thr Gly	
4195 4200 4205	
cgg ctg tcg gtg tcc tcg cac ccc tgg ctg gct gac cat gtg gtg ctg	12672
Arg Leu Ser Val Ser His Pro Trp Leu Ala Asp His Val Val Leu	
4210 4215 4220	
ggc tcc gtc ctc gtg ccc ggc acc gct ctg gtg gaa ctg gtg ctg cgg	12720
Gly Ser Val Leu Val Pro Gly Thr Ala Leu Val Glu Leu Val Leu Arg	
4225 4230 4235 4240	
gct gcc gac gag gcc ggc tgt gac ctc ctg gag gag ctg acg ctc gcc	12768
Ala Ala Asp Glu Ala Gly Cys Asp Leu Leu Glu Glu Leu Thr Leu Ala	
4245 4250 4255	
gca ccg ctg gtg ctg ccc gcc tcg ggc gcc gct gtc cag gtt cag gta	12816
Ala Pro Leu Val Leu Pro Ala Ser Gly Ala Ala Val Gln Val Gln Val	
4260 4265 4270	
gct gtg ggc gag ccc gat gag gct ggc cgc cgg ccg gtc tcg gtc cat	12864
Ala Val Gly Glu Pro Asp Glu Ala Gly Arg Arg Pro Val Ser Val His	
4275 4280 4285	
gca cgt gag ggc gag ggc cca tgg acg ctg cac gcc agt ggt gct gtg	12912
Ala Arg Glu Gly Glu Gly Pro Trp Thr Leu His Ala Ser Gly Ala Val	
4290 4295 4300	
acc tcg ggc gcc gaa gtg ccc ccc ttc gac gcc acc gta tgg ccg ccc	12960
Thr Ser Gly Ala Glu Val Pro Pro Phe Asp Ala Thr Val Trp Pro Pro	
4305 4310 4315 4320	
aag ggc gct gag ccc gtg gac gtg gct gac tgc tac gac gta ctc gcc	13008
Lys Gly Ala Glu Pro Val Asp Val Ala Asp Cys Tyr Asp Val Leu Ala	
4325 4330 4335	
gat gcc ggg ctc acc tac ggc ccc ttc cac ggc ctg caa gct gcc	13056
Asp Ala Gly Leu Thr Tyr Gly Pro Ala Phe His Gly Leu Gln Ala Ala	
4340 4345 4350	
tgg aag ctc ggt ggg gac gtc tac gct gag gct aag ctc ccc gag agc	13104
Trp Lys Leu Gly Gly Asp Val Tyr Ala Glu Ala Lys Leu Pro Glu Ser	
4355 4360 4365	
acc gac ggc gac gca tac ggt ctg cac ccc gct ctc ttc gac gcc gct	13152
Thr Asp Gly Asp Ala Tyr Gly Leu His Pro Ala Leu Phe Asp Ala Ala	
4370 4375 4380	

ctg cac gcg tcg gcg ctg ggc ggc gcg gaa gcg ggc gga gtc ccg ttc	13200
Leu His Ala Ser Ala Leu Gly Gly Ala Glu Ala Gly Gly Val Pro Phe	
4385 4390 4395 4400	
tcc tgg gcc gga gtg tcg ctg cac gcg acc ggc gcc tcg cac ctc cgc	13248
Ser Trp Ala Gly Val Ser Leu His Ala Thr Gly Ala Ser His Leu Arg	
4405 4410 4415	
gtc cgc atc cgc gaa gcg ggc ggc gcg ctg tcg gtc gcg atc gcg gac	13296
Val Arg Ile Arg Glu Ala Gly Gly Ala Leu Ser Val Ala Ile Ala Asp	
4420 4425 4430	
acg tcc ggc gcg ccg gtc gcc tcg gtg gag tcg ctg gtg ata cgt ccg	13344
Thr Ser Gly Ala Pro Val Ala Ser Val Glu Ser Leu Val Ile Arg Pro	
4435 4440 4445	
ctc tcg gcc ggg cag gtg cag gcc gac cgt gac gcc ctc ttc aag	13392
Leu Ser Ala Gly Gln Val Gln Ala Ala Asp Arg Asp Ala Leu Phe Lys	
4450 4455 4460	
gcc gac tgg gtc ccc gta ccg ctc acg gac gaa cgc gtc gag ccg ggc	13440
Ala Asp Trp Val Pro Val Pro Leu Thr Asp Glu Arg Val Glu Pro Gly	
4465 4470 4475 4480	
acc ggc ccg gag ggc gag ccg ctg cgg acg tac gct gat ctg gat tcc	13488
Thr Gly Pro Glu Gly Glu Pro Leu Arg Thr Tyr Ala Asp Leu Asp Ser	
4485 4490 4495	
ctg gag ggc gcg gcc gtg ccc ggg acg gtc ctg gtc gcg ccg cct tcc	13536
Leu Glu Gly Ala Ala Val Pro Gly Thr Val Leu Val Ala Pro Pro Ser	
4500 4505 4510	
ggc gct gcc ggg acg gtg gag tcc gta cac gcc gcg acc gtc tgg gcg	13584
Gly Ala Ala Gly Thr Val Glu Ser Val His Ala Ala Thr Val Trp Ala	
4515 4520 4525	
ctg gag atg gtg cag gcg tgg ctg gcc gac cgg ttc gcc acc acc tcg	13632
Leu Glu Met Val Gln Ala Trp Leu Ala Asp Asp Arg Phe Ala Thr Ser	
4530 4535 4540	
cga ctg gtg ttc gtc acc cgc ggc gcg gcc ttc ggc gcg gat ctt gcg	13680
Arg Leu Val Phe Val Thr Arg Gly Ala Ala Phe Gly Ala Asp Leu Ala	
4545 4550 4555 4560	
gct gcc gcc gtc cgg ggc ctg gtg cgc tcg gca cag tcg gag aac ccg	13728
Ala Ala Ala Val Arg Gly Leu Val Arg Ser Ala Gln Ser Glu Asn Pro	
4565 4570 4575	
ggc cgc ttc ggc ctg gtg gac atg gac ggc gac gcc gat acg acc gta	13776
Gly Arg Phe Gly Leu Val Asp Met Asp Gly Asp Ala Asp Thr Val	
4580 4585 4590	
ccg gcg caa gcg ctc gcg acc gac gag ccc gaa ctg ctg gtg cgt ggt	13824
Pro Ala Gln Ala Leu Ala Thr Asp Glu Pro Glu Leu Leu Val Arg Gly	
4595 4600 4605	
ggt gag gtg ctg gcg gcc cgg ctg gtc cgg gcg cag tcc tcg cac acc	13872
Gly Glu Val Leu Ala Ala Arg Leu Val Arg Ala Gln Ser Ser His Thr	
4610 4615 4620	
gtg acg tgg gat ccg tcc ggt acg gtc ctg atc acc ggc ggg acc ggt	13920

Val Thr Trp Asp Pro Ser Gly Thr Val Leu Ile Thr Gly Gly Thr Gly			
4625	4630	4635	4640
ggg ctg ggc cgt agt gtc gcc cgg cac ttg gtg agc gag cac ggg gtg			13968
Gly Leu Gly Arg Ser Val Ala Arg His Leu Val Ser Glu His Gly Val			
4645	4650	4655	
cgc agt ctg ctg gtc agc cgc cgt ggt ccc gcg gcc gag ggt gcc			14016
Arg Ser Leu Leu Val Ser Arg Arg Gly Pro Ala Ala Glu Gly Ala			
4660	4665	4670	
ggg gag ttg gtg gcc gaa ctc agg ggc agt ggc gcc gag gtg gtc atc			14064
Gly Glu Leu Val Ala Glu Leu Arg Gly Ser Gly Ala Glu Val Val Ile			
4675	4680	4685	
gag gct tgt gat gtg acc gat gcg gtg gcg gtc gat ctg gtg gct			14112
Glu Ala Cys Asp Val Thr Asp Ala Val Ala Val Ala Asp Leu Val Ala			
4690	4695	4700	
cgg cat cgg atc agt gct gtg gtg cat acg gcc ggt gtt ctg gtg gct			14160
Arg His Arg Ile Ser Ala Val Val His Thr Ala Gly Val Leu Asp Asp			
4705	4710	4715	4720
ggt gtg gtg gag tcg ctg acg ccg gag cgg ctt gcg gtg gtg ttg cgt			14208
Gly Val Val Glu Ser Leu Thr Pro Glu Arg Leu Ala Val Val Leu Arg			
4725	4730	4735	
ccg aag gtg gat gcg gcc tgg aac ctg cac gag gcg acc agg ggt ctg			14256
Pro Lys Val Asp Ala Ala Trp Asn Leu His Glu Ala Thr Arg Gly Leu			
4740	4745	4750	
gat ctg gat gcg ttt gtg gtc ttc tcg tcc gtg gca ggc act ttc ggc			14304
Asp Leu Asp Ala Phe Val Val Phe Ser Ser Val Ala Gly Thr Phe Gly			
4755	4760	4765	
agt gcg ggt cag gcc aat tac gcg gcg ggt aat gct ttc ctg gac gcg			14352
Ser Ala Gly Gln Ala Asn Tyr Ala Ala Gly Asn Ala Phe Leu Asp Ala			
4770	4775	4780	
ctg gcg tat cac cgt cgg gcg gtg ggt ctg ccg gcg gtg tcg ctg gcg			14400
Leu Ala Tyr His Arg Arg Ala Val Gly Leu Pro Ala Val Ser Leu Ala			
4785	4790	4795	4800
tgg ggc cct tgg tcg cag gac ggt atg acc ggc acc ttg agc gac			14448
Trp Gly Pro Trp Ser Gln Asp Gly Gly Met Thr Gly Thr Leu Ser Asp			
4805	4810	4815	
gcc gat gtc cag cgc atc gcc cgg cag ggc atg ccg ccg ctg acc gtc			14496
Ala Asp Val Gln Arg Ile Ala Arg Gln Gly Met Pro Pro Leu Thr Val			
4820	4825	4830	
gag gag ggt ctg gcc ctc ttc gac gcc gcg ctc ggc agc gcc gaa ccc			14544
Glu Glu Gly Leu Ala Leu Phe Asp Ala Ala Leu Gly Ser Ala Glu Pro			
4835	4840	4845	
atg gca ctc ccg gtc cgc ctg gac ctg gcg ctg cgg gca caa ggc			14592
Met Ala Leu Pro Val Arg Leu Asp Leu Ala Ala Leu Arg Ala Gln Gly			
4850	4855	4860	
gag ccc cag cca ctg ctg cgc ggc ctc atc cgg acg agg acc cgc cgg			14640
Glu Pro Gln Pro Leu Leu Arg Gly Leu Ile Arg Thr Arg Thr Arg Arg			

4865	4870	4875	4880	
tcc ggc gcc gcc gca tcc ggc atc gcg cag cgc ctt gcc ggg ctg Ser Gly Ala Ala Ala Ala Ser Gly Ile Ala Gln Arg Leu Ala Gly Leu 4885	4890	4895		14688
tcc acg gcg gag cgg cgc gag gcg ctg ctc gat gtc gta cgg gcc cag Ser Thr Ala Glu Arg Arg Glu Ala Leu Leu Asp Val Val Arg Ala Gln 4900	4905	4910		14736
atc gcg acg gtc ctg ggc cac gcc ccc gaa acg atc gcc cct gac Ile Ala Thr Val Leu Gly His Ala Gly Pro Glu Thr Ile Ala Pro Asp 4915	4920	4925		14784
cgg gcc ttc cag gac ctc ggc ctc gac tcc ctg acg gcg atc gaa ctc Arg Ala Phe Gln Asp Leu Gly Leu Asp Ser Leu Thr Ala Ile Glu Leu 4930	4935	4940		14832
cgt aac ctg ctc ggc aag gcc acc ggg ctg cgg ctc ccg gca acg acc Arg Asn Leu Leu Gly Lys Ala Thr Gly Leu Arg Leu Pro Ala Thr Thr 4945	4950	4955	4960	14880
gtg ttc gac tac ccc acg gtg gat gcc ctg gcc gcc cac ctc ttg gac Val Phe Asp Tyr Pro Thr Val Asp Ala Leu Ala Ala His Leu Leu Asp 4965	4970	4975		14928
gaa ctg ttc ggc gcg gag acg ggg acc gcg acg gag acg ccc ctc ccg Glu Leu Phe Gly Ala Glu Thr Gly Thr Ala Thr Glu Thr Pro Leu Pro 4980	4985	4990		14976
gtg ccc ggc ctg ccg tcc ctg gcg gac gat ccg gtc gtg atc gtc ggc Val Pro Gly Leu Pro Ser Leu Ala Asp Asp Pro Val Val Ile Val Gly 4995	5000	5005		15024
atg agc tgc cgc ttc ccc ggc ggc gtc gcc tcg ccg gag gac ctg tgg Met Ser Cys Arg Phe Pro Gly Gly Val Ala Ser Pro Glu Asp Leu Trp 5010	5015	5020		15072
cgc ctg gtg gcg gac ggc gtg gac gcc gtc tcc gcc ttc ccg acc gac Arg Leu Val Ala Asp Gly Val Asp Ala Val Ser Ala Phe Pro Thr Asp 5025	5030	5035	5040	15120
cgg ggc tgg gag atc gac gac acc tac gac ccc gag cgg gag ggc gcc Arg Gly Trp Glu Ile Asp Asp Thr Tyr Asp Pro Glu Arg Glu Gly Ala 5045	5050	5055		15168
atc gcc acc cgt tcc ggt gga ttc ctc cac gac gcg gcg gag ttc gac Ile Ala Thr Arg Ser Gly Gly Phe Leu His Asp Ala Ala Glu Phe Asp 5060	5065	5070		15216
ccc gag ttc ttc ggg atg agc ccg cgc gag gcc ctg acc acc gac gcc Pro Glu Phe Phe Gly Met Ser Pro Arg Glu Ala Leu Thr Thr Asp Ala 5075	5080	5085		15264
cag cag cgg ctg ttg ctg gag acg acc tgg gag gcg ctg gag cgc gcc Gln Gln Arg Leu Leu Leu Glu Thr Thr Trp Glu Ala Leu Glu Arg Ala 5090	5095	5100		15312
ggt atg gac ccg gcc acg ctc cgc ggc agc cgc acg ggt gtc ttc gcc Gly Met Asp Pro Ala Thr Leu Arg Gly Ser Arg Thr Gly Val Phe Ala 5105	5110	5115	5120	15360

ggc gtg atg tac cac gac tac tcg acg ctg ctc tcc ggg cgc gag ttc			15408
Gly Val Met Tyr His Asp Tyr Ser Thr Leu Leu Ser Gly Arg Glu Phe			
5125	5130	5135	
gag ggc tac cag ggc agc ggc agc gca ggc agt gtg gcc tcg ggc cg			15456
Glu Gly Tyr Gln Gly Ser Gly Ser Ala Gly Ser Val Ala Ser Gly Arg			
5140	5145	5150	
gtc tcg tac acc ttc ggt ttc gag ggt ccg gcg gtc acg gtg gac acg			15504
Val Ser Tyr Thr Phe Gly Phe Glu Gly Pro Ala Val Thr Val Asp Thr			
5155	5160	5165	
gcg tgc tcg tcc ctg gtc gcc ctg cac ctg gca gca cag tcg ctg			15552
Ala Gys Ser Ser Ser Leu Val Ala Leu His Leu Ala Ala Gln Ser Leu			
5170	5175	5180	
cgc tcg ggc gag tgc tcg ctg gcg ctc gcg ggc ggt gtg acg gtg atg			15600
Arg Ser Gly Glu Cys Ser Leu Ala Leu Ala Gly Gly Val Thr Val Met			
5185	5190	5195	5200
tcc aca ccg ctg acc ttc gtg gag ttc tcc cgc cag ggc gga ctg tcg			15648
Ser Thr Pro Leu Thr Phe Val Glu Phe Ser Arg Gln Gly Gly Leu Ser			
5205	5210	5215	
gcg gac ggc cgc tgc aag gcg ttc gcc gat gcg gcc gac ggc gtc ggc			15696
Ala Asp Gly Arg Cys Lys Ala Phe Ala Asp Ala Ala Asp Gly Val Gly			
5220	5225	5230	
tgg gcc gaa ggc gcc gga atc ctg gtg ctg gag cgt ctg tcg gac gcc			15744
Trp Ala Glu Gly Ala Gly Ile Leu Val Leu Glu Arg Leu Ser Asp Ala			
5235	5240	5245	
cgc cgc aac ggg cac cgc atc ctc gcg acg gtg cgc ggc agt gcg gtg			15792
Arg Arg Asn Gly His Arg Ile Leu Ala Thr Val Arg Gly Ser Ala Val			
5250	5255	5260	
aac cag gac ggt gcg tcc aat ggt ctg acg gcg ccg aac ggt ccc gcc			15840
Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala Pro Asn Gly Pro Ala			
5265	5270	5275	5280
cag cag cgg gtg atc cgg cag gcg ctg gcg agt gcg ggg ctg tcg gcg			15888
Gln Gln Arg Val Ile Arg Gln Ala Leu Ala Ser Ala Gly Leu Ser Ala			
5285	5290	5295	
gcg gat gtg gac gcg gtg gag gcg cac ggt acg acg acg ctg ggc			15936
Ala Asp Val Asp Ala Val Glu Ala His Gly Thr Gly Thr Thr Leu Gly			
5300	5305	5310	
gat ccg atc gag gcc cag gcg ctg ctc gcg acg tat ggc cag gag cgg			15984
Asp Pro Ile Glu Ala Gln Ala Leu Leu Ala Thr Tyr Gly Gln Glu Arg			
5315	5320	5325	
ccg gag gac cgg ccg ttg ctg ctc ggc tcc gtg aag tcc aac atc ggt			16032
Pro Glu Asp Arg Pro Leu Leu Leu Gly Ser Val Lys Ser Asn Ile Gly			
5330	5335	5340	
cac gcg caa gcg gct tcg ggt gtt gcc ggt gtc atc aag atg gtg ctg			16080
His Ala Gln Ala Ala Ser Gly Val Ala Gly Val Ile Lys Met Val Leu			
5345	5350	5355	5360

gct atg cgg cac ggt gtg cct cgg acg ctg cat gtc gac gag ccg Ala Met Arg His Gly Val Leu Pro Arg Thr Leu His Val Asp Glu Pro	5365	5370	5375	16128	
tcg tcg cat gtc gac tgg agc gcc ggt gcc gtc gag ctg ctg acc tcc Ser Ser His Val Asp Trp Ser Ala Gly Ala Val Glu Leu Leu Thr Ser	5380	5385	5390	16176	
gag gcc gag tgg ccg cag ggc gag ggg ccg cgc cgc gct tcc Glu Ala Glu Trp Pro Gln Gly Glu Gly Pro Arg Arg Ala Gly Val Ser	5395	5400	5405	16224	
tcc ttc ggc atc agt ggg acg aac gct cat gtg atc ctg gag cag ccc Ser Phe Gly Ile Ser Gly Thr Asn Ala His Val Ile Leu Glu Gln Pro	5410	5415	5420	16272	
gaa ccg gtc gct gct gaa acg gaa tcg atc acg ccc gac acc gca ccg Glu Pro Val Ala Ala Glu Thr Ser Ile Thr Pro Asp Thr Ala Pro	5425	5430	5435	5440	16320
gac gcc gcc gag gac gag gct gat tcc ggg acg ccg gtg ccg gca Asp Ala Ala Glu Asp Glu Ala Ala Asp Ser Gly Thr Pro Val Pro Ala	5445	5450	5455	16368	
ctg ctg tcc ggc agg agc gca tcg gct ctg cgg gcc cag gca gca cga Leu Leu Ser Gly Arg Ser Ala Ser Ala Leu Arg Ala Gln Ala Ala Arg	5460	5465	5470	16416	
ctg ctg tcc cga ctc gac ggc gat ccg ggg ccg cgg atc act gac gtc Leu Leu Ser Arg Leu Asp Gly Asp Pro Gly Pro Arg Ile Thr Asp Val	5475	5480	5485	16464	
gcc tac tcc ctc gct acc ggc cgt tcg gcc ttc ccg cac ccg gct gtc Ala Tyr Ser Leu Ala Thr Gly Arg Ser Ala Phe Pro His Arg Ala Val	5490	5495	5500	16512	
atc ctc gcc gct aac cga gct gac ctg ctg cac tcg ctg tcc gcc ctg Ile Leu Ala Ala Asn Arg Ala Asp Leu Leu His Ser Leu Ser Ala Leu	5505	5510	5515	5520	16560
gcc gag ggc cac acc gag gct ccg gcc gta gtc gca cag gac cga gcc Ala Glu Gly His Thr Glu Ala Pro Ala Val Val Ala Gln Asp Arg Ala	5525	5530	5535	16608	
cgc tcg ggc aag ctg gcc ttc ctg ttc tcg ggg cag gga tcg caa cgc Arg Ser Gly Lys Leu Ala Phe Leu Phe Ser Gly Gln Gly Ser Gln Arg	5540	5545	5550	16656	
ctg ggc atg gga cgg gag ttg tac ggt cgc tac ccg gct ttc gcc gag Leu Gly Met Gly Arg Glu Leu Tyr Gly Arg Tyr Pro Ala Phe Ala Glu	5555	5560	5565	16704	
gcc ctc gac gct gtg tgc gcc ccg ctg gac gcc cac ctg gac cgt ccc Ala Leu Asp Ala Val Cys Ala Ala Leu Asp Ala His Leu Asp Arg Pro	5570	5575	5580	16752	
ctg cgg gac gtc atc tgg ggc gag gac gct gaa ctg ctg aac cgg acc Leu Arg Asp Val Ile Trp Gly Glu Asp Ala Glu Leu Leu Asn Arg Thr	5585	5590	5595	5600	16800
ggg tac gcc cag aca ggg ctg ttc gcc atc gag gtg gcc ctg ttc cgc				16848	

Gly Tyr Ala Gln Thr Gly Leu Phe Ala Ile Glu Val Ala Leu Phe Arg			
5605	5610	5615	
ctg ctg gag tcg tgg ggc gta cgc ccg gac cac ctg ctg ggg cac tcc			16896
Leu Leu Glu Ser Trp Gly Val Arg Pro Asp His Leu Leu Gly His Ser			
5620	5625	5630	
atc gga gaa atc gcc gcg gcc cat gtg gcg ggc gtc ctc tcc ctc ccg			16944
Ile Gly Glu Ile Ala Ala His Val Ala Gly Val Leu Ser Leu Pro			
5635	5640	5645	
gac gcc tgt gcg ctg gtg gcg gcc cga ggt cgg ctg atg cag caa ctg			16992
Asp Ala Cys Ala Leu Val Ala Ala Arg Gly Arg Leu Met Gln Gln Leu			
5650	5655	5660	
ccg tcc ggc ggc gcg atg atg gcg atc cgg gcg acc gag gac gag gtc			17040
Pro Ser Gly Gly Ala Met Met Ala Ile Arg Ala Thr Glu Asp Glu Val			
5665	5670	5675	5680
ctt ccg cat ctg gcg gaa ggc gtc tcg ctc gcg gtc aac ggg ccc			17088
Leu Pro His Leu Ala Glu Gly Val Ser Leu Ala Ala Val Asn Gly Pro			
5685	5690	5695	
tcg tcg gtc gtg gtc tcc ggc gcc gag gac gag gta ctc gcc ctc gcg			17136
Ser Ser Val Val Ser Gly Ala Glu Asp Glu Val Leu Ala Leu Ala			
5700	5705	5710	
gcg cac ttc gag gaa gag gga cgc aag acc acc cga ctg cgg gtc tcg			17184
Ala His Phe Glu Glu Gly Arg Lys Thr Thr Arg Leu Arg Val Ser			
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cac gcc ttc cac tcc ccg ctc atg gaa cgc atg ctg gcc gac ttc cgg			17232
His Ala Phe His Ser Pro Leu Met Glu Pro Met Leu Ala Asp Phe Arg			
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gcc gtc gcc gac ggc atg acc tac gcc gcg ccc atc ccc gtg gtc			17280
Ala Val Ala Asp Gly Met Thr Tyr Ala Ala Pro Arg Ile Pro Val Val			
5745	5750	5755	5760
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Ser Asn Val Thr Gly Arg Pro Ala Thr Ala Glu Glu Leu Cys Cys Ala			
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Glu Tyr Trp Val Gly His Val Arg Glu Ala Val Arg Phe Ala Asp Gly			
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Val Gly Ala Leu Arg Glu Gln Gly Val Thr Thr Phe Leu Glu Leu Gly			
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Pro Asp Gly Ser Leu Ser Ala Leu Ala Glu Ser Ala Ala Asp Asp			
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Ser Val Leu Ala Pro Val Leu Arg Lys Asn Arg Pro Glu Ala Pro Ala			
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Leu Leu Thr Ala Leu Ala Arg Leu His Ala Gln Gly Thr Pro Val Asp			

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5860	5865	5870	
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5875	5880	5885	
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5905	5910	5915	5920
acc ggg cgg ctg tcc ctg tcc tcg cac ccg tgg ctg gcg gat cac gtg Thr Gly Arg Leu Ser Leu Ser Ser His Pro Trp Leu Ala Asp His Val			17808
5925	5930	5935	
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5985	5990	5995	6000
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6005	6010	6015	
gcc ctg gcc ccg gcg gcc gag acg gtg ccg ttc gat acc gcg ata tgg Ala Leu Ala Pro Ala Ala Glu Thr Val Pro Phe Asp Thr Ala Ile Trp			18096
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ccc ccg cag ggt gcc gag cac ctg gac gcg ggc tgt tac gag cgg Pro Pro Gln Gly Ala Glu His Leu Asp Ala Ala Gly Cys Tyr Glu Arg			18144
6035	6040	6045	
ttc gcg gac gcc gga ttc gcg tac ggc ccg gtg ttc cag ggc ctg cgg Phe Ala Asp Ala Gly Phe Ala Tyr Gly Pro Val Phe Gln Gly Leu Arg			18192
6050	6055	6060	
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6065	6070	6075	6080
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6085	6090	6095	

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Ala Val Pro Phe Ser Trp Asn Gly Val Thr Leu His Ala Thr Gly Ala	
6115 6120 6125	
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Ser Arg Val Arg Val Arg Ile Arg Pro Thr Glu Gly Gly Thr Ser Ile	
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Thr Ala Arg Pro Ile Thr Ala Gly Gln Leu Gln Thr Gly Asp Arg Asp	
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Thr Leu Ser Leu Gln Pro His Ala Asp Leu Asp Asp Leu Ala Ala Thr	
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Leu Pro Val Arg Leu Asp Leu Ala Ala Leu Arg Ala Gln Gly Glu Pro	6580	6585	6590		
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cgc agc cag atc gcg ggg gtc ctc gga cac gcc gaa gcc acg gaa atc Arg Ser Gln Ile Ala Gly Val Leu Gly His Ala Glu Ala Thr Glu Ile	6645	6650	6655		19968
gac cag gac cgc gcc ttc ctg gac ctc gga ttc gac tcc ctc acc gcg Asp Gln Asp Arg Ala Phe Leu Asp Leu Gly Phe Asp Ser Leu Thr Ala	6660	6665	6670		20016
gtc gaa ctc cgc aac cgc ctg ggc gcc gtc acc gga atc cgc ctg ccg Val Glu Leu Arg Asn Arg Leu Gly Ala Val Thr Gly Ile Arg Leu Pro	6675	6680	6685		20064
gcg acc ctg ctc ttc gac tac ccg acg ccg gca gaa ctc gtc gcc cac Ala Thr Leu Leu Phe Asp Tyr Pro Thr Pro Ala Glu Leu Val Ala His	6690	6695	6700		20112
ctc cat gcc cgg atc gca ccg gag ccg acc gtc ggc ccg gag gcg ctc Leu His Ala Arg Ile Ala Pro Glu Pro Thr Val Gly Pro Glu Ala Leu	6705	6710	6715	6720	20160
ctg ggc gaa ctc gaa agg atg gag aag tcc ttc ggc gga ctc gac ctc Leu Gly Glu Leu Glu Arg Met Glu Lys Ser Phe Gly Gly Leu Asp Leu	6725	6730	6735		20208
acg gag gag atg cac gaa cag ata gcc ggc cgt ctg gaa gtc ctc ccg Thr Glu Glu Met His Glu Gln Ile Ala Gly Arg Leu Glu Val Leu Arg	6740	6745	6750		20256
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ggt tcc ccg tcc gac gag gac ttc gac ttc gag tcc gcc tcc gac gac Gly Ser Pro Ser Asp Glu Asp Phe Asp Phe Glu Ser Ala Ser Asp Asp	6770	6775	6780		20352
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 <212> PRT
 <213> Streptomyces natalensis

<400> 4

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1				5				10						15	

Asp Leu His Glu Thr Arg Gln Gln Leu Asp Glu Thr Glu Ala Lys Gln

20		25	30
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Arg Glu Pro Leu Ala Ile Val Ser Met Ala Cys Arg Phe Pro Gly Gly

35		40	45
----	--	----	----

Val Arg Ser Pro Glu Glu Leu Trp Glu Leu Leu Arg Asp Gly Val Asp

50		55	60
----	--	----	----

Ala Val Ser Ser Phe Pro Arg Asn Arg Gly Trp Asp Leu Asp Ala Leu

65		70	75	80
----	--	----	----	----

Tyr His Ser Asp Pro Ala His Gln Gly Thr Ser Tyr Ala Arg Glu Gly

85		90	95
----	--	----	----

Gly Phe Leu His Asp Ala Gly Glu Phe Asp Pro Gly Phe Gly Ile

100		105	110
-----	--	-----	-----

Ser Pro Arg Glu Ala Leu Ala Met Asp Pro Gln Gln Arg Leu Leu Leu

115		120	125
-----	--	-----	-----

Glu Thr Ala Trp Glu Ala Val Glu Arg Ala Gly Ile Asp Pro Glu Ser

130		135	140
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Leu Ala Gly Ser Arg Thr Gly Val Phe Val Gly Thr Gly His Gly Gly

145		150	155	160
-----	--	-----	-----	-----

Tyr Asp Ala Glu Gly Arg Arg Ala Asp Glu Val Gly Gly His Leu

165		170	175
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Leu Thr Gly Asn His Ile Ser Ile Ala Ser Gly Arg Ile Ser Tyr Val

180		185	190
-----	--	-----	-----

Leu Gly Leu Glu Gly Pro Ala Leu Thr Val Asp Thr Ala Cys Ser Ser

195		200	205
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Ser Leu Val Ala Leu His Leu Ala Met His Ala Leu Arg Arg Asp Glu

210		215	220
-----	--	-----	-----

Cys Ala Met Ala Leu Val Gly Gly Ala Thr Val Met Ser Thr Pro Gln

225		230	235	240
-----	--	-----	-----	-----

Met Phe Val Glu Phe Ser Arg Gln Arg Gly Leu Ala Pro Asp Gly Arg

245		250	255
-----	--	-----	-----

Cys Lys Pro Phe Ala Ala Ala Asp Gly Thr Gly Trp Ser Glu Gly

260		265	270
-----	--	-----	-----

Val Gly Leu Leu Leu Val Glu Arg Leu Ser Asp Ala Val Arg Asn Gly

275		280	285
-----	--	-----	-----

Tyr Pro Val Leu Ala Val Leu Lys Gly Ser Ala Val Asn Gln Asp Gly

290		295	300
-----	--	-----	-----

Ala Ser Asn Gly Leu Thr Ala Pro Asn Gly Pro Ser Gln Gln Arg Val

305		310	315	320
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Ile Arg Gln Ala Leu Thr Gly Ala Gly Leu Ala Ala Ser Asp Ile Asp
 325 330 335

Ala Val Glu Ala His Gly Thr Gly Thr Thr Leu Gly Asp Pro Val Glu
 340 345 350

Ala His Ala Leu Leu Ala Thr Tyr Gly Gln Gln Arg Ala Ala Asp Arg
 355 360 365

Pro Cys Gly Leu Gly Ser Met Lys Ser Asn Ile Gly His Thr Gln Ala
 370 375 380

Ala Ala Gly Ile Ala Gly Val Met Lys Met Val Leu Ala Met Arg His
 385 390 395 400

Gly His Leu Pro Arg Thr Leu His Leu Asp Glu Pro Thr Gly His Val
 405 410 415

Asp Trp Ser Glu Gly Asn Ala Arg Leu Leu Ala Glu Pro Glu Pro Trp
 420 425 430

Pro Ser Ala Gly Arg Pro Arg Arg Ala Ala Val Ser Ser Phe Gly Ile
 435 440 445

Ser Gly Thr Asn Ala His Val Ile Leu Glu Gln Ala Pro Ala His Glu
 450 455 460

Ala Glu Pro Ala Pro Glu Pro Ala Ala Arg Pro Gly Ala Leu Pro Trp
 465 470 475 480

Ile Leu Ser Ala Arg Thr Glu Ala Gly Leu Arg Ala Gln Ala Asp Arg
 485 490 495

Leu Gly Arg His Leu Arg Asp Arg Ala Asp Leu Glu Pro Ala Ala Val
 500 505 510

Ala His Ala Leu Ala Asp Thr Arg Thr Leu Met Glu His Arg Ala Val
 515 520 525

Val Val Ala Gly Asp Arg Glu Glu Phe Leu Arg Gly Leu Asp Ala Leu
 530 535 540

Ala Ala Gly Arg Thr Ala Asn Gly Leu Val Ser Gly Val Ala Val Lys
 545 550 555 560

Ala Ala Ser Ala Phe Leu Phe Ala Gly Gln Gly Ser Gln Arg Pro Gly
 565 570 575

Met Gly Arg Glu Leu His Ala Ala His Pro Val Phe Ala Thr Ala Phe
 580 585 590

Asp Ala Val Cys Ala Glu Leu Asp Pro His Leu Asp Arg Pro Leu Arg
 595 600 605

Asp Ile Val Phe Ala Glu Glu Gly Ser Ala Glu Ala Ala Leu Leu Asp
 610 615 620

Gln Thr Ala Tyr Thr Gln Ala Ala Leu Phe Ala Leu Glu Thr Ala Leu
 625 630 635 640

Phe Arg Leu Val Glu Ser Trp Gly Val Ala Pro Arg Phe Val Ala Gly

645	650	655
His Ser Ile Gly Glu Leu Thr Ala Ala His Val Ser Gly Val Leu Thr		
660	665	670
Leu His Asp Ala Ala Arg Leu Val Ala Ala Arg Gly Thr Leu Met Gln		
675	680	685
Ala Leu Pro Ala Gly Gly Ala Met Val Ala Val Gln Ala Thr Glu Asp		
690	695	700
Glu Ile Arg Glu Arg Leu Ala Gly His Glu Asp His Val Ala Leu Ala		
705	710	715
Ala Ala Asn Gly Pro Asp Ser Thr Val Ile Ser Gly Asp Glu Gln Ala		
725	730	735
Val Thr Glu Ile Ala Ala His Trp Glu Ala Gln Gly Arg Arg Thr Lys		
740	745	750
Arg Leu Arg Val Ser His Ala Phe His Ser Pro His Met Asp Asp Met		
755	760	765
Leu Glu Asp Phe Arg Arg Val Ala Arg Gly Leu Thr Phe His Ala Pro		
770	775	780
Arg Ile Pro Val Val Ser Thr Val Thr Gly Ala Leu Ala Thr Glu Asp		
785	790	795
Glu Leu Arg Ser Pro Asp Tyr Trp Val Arg Gln Val Arg Glu Thr Val		
805	810	815
Arg Phe Cys Ala Ala Val Arg Thr Leu Glu Ala Glu Gly Val Thr Thr		
820	825	830
Phe Val Glu Ile Gly Thr Gly Val Leu Thr Pro Met Val Gln Asp		
835	840	845
Cys Leu Thr Thr Leu Glu Glu Pro Val Leu Val Pro Leu Leu Arg Thr		
850	855	860
Gly Arg Pro Glu Thr Val Ala Leu Thr Glu Gly Val Ala Thr Ala Phe		
865	870	875
Val His Gly Val Pro Val Asp Arg Ser Ala Phe Pro Gly Ala Pro Gly		
885	890	895
Thr Ser Arg Ala Asp Leu Pro Thr Tyr Ala Phe Gln Arg Gln Trp Tyr		
900	905	910
Trp Leu Asp Pro Ala Asp His Asp Glu Gly Glu Ala Ala Ala Glu		
915	920	925
Ala Gly Glu Ala Gly Phe Trp Ala Ala Val Glu Arg Glu Asp Leu Gln		
930	935	940
Glu Leu Ser Ala Val Leu Ala Ile Asp Gly Ser Glu Ala Asp Ser Leu		
945	950	955
Gly Ser Phe Leu Pro Thr Leu Ser Ser Trp Arg Arg Gln Arg Arg Thr		
965	970	975

Gln Ala Ala Ala Asp Arg Phe Ser Tyr Arg Thr His Trp Ala Pro Arg
 980 985 990
 Thr Ala Ser Gly Gly Pro Thr Ala Thr Gly His Trp Leu Val Val Leu
 995 1000 1005
 Pro Glu Gly Gly Thr Asp Asp Pro Trp Thr Ala Arg Leu Leu Asp Ala
 1010 1015 1020
 Leu Asn Asp Gln Gly Leu His Thr Asp Val Arg Glu Leu Pro Ala Asp
 025 1030 1035 1040
 His Glu Pro Asp Ala Trp Gly Arg His Pro Val Asp Gly Val Leu Cys
 1045 1050 1055
 Leu Leu Ala Leu Asp Glu Arg Pro Thr Arg Ser Cys Pro Pro Tyr Arg
 1060 1065 1070
 Arg Gly Leu Ala Ala Thr Thr Asn Ala Ala Ala Arg Pro Glu Gly Ala
 1075 1080 1085
 Gly Ile Gln Ala Pro Leu Trp Cys Val Thr Arg Gly Ala Val Ala Val
 1090 1095 1100
 Asp Arg His Glu Ala Leu Lys Ser Pro Leu Gln Ala Gln Thr Trp Gly
 105 1110 1115 1120
 Leu Gly Arg Val Ala Ala Leu Glu Ser Pro Gln Ser Trp Gly Gly Leu
 1125 1130 1135
 Ile Asp Leu Pro Asp Asn Leu Asp Gly Arg Ala Val Ser Ala Leu Leu
 1140 1145 1150
 Ser Thr Leu Ala Gly Glu Glu Asp Gln Val Ala Val Arg Pro Ala Gly
 1155 1160 1165
 Val Phe Ala Arg Arg Leu Glu Arg Ile Thr Pro Gly Gly Asp Thr Gly
 1170 1175 1180
 Asp Arg Trp Ser Thr His Gly Thr Val Leu Val Thr Gly Gly Thr Gly
 1185 1190 1195 1200
 Ala Leu Gly Ala His Leu Ala His Trp Leu Ala Asp Ala Gly Ala Glu
 1205 1210 1215
 His Leu Val Leu Thr Gly Arg Arg Gly Pro Gln Ala Pro Gly Ala Pro
 1220 1225 1230
 Glu Leu Ala Ala Ala Leu Thr Asp Arg Gly Val Lys Val Thr Leu Ala
 1235 1240 1245
 Ala Cys Asp Ala Ala Asp Arg Asp Ala Leu Ala Ala Val Leu Ala Asp
 1250 1255 1260
 Ile Pro Pro His Leu Pro Leu Thr Gly Val Val His Ala Ala Gly Val
 1265 1270 1275 1280
 Leu Asp Asp Gly Val Leu Asp Ala Leu Thr Pro Glu Arg Phe Glu Thr
 1285 1290 1295

Val Leu Arg Pro Lys Ala Arg Ala Ala Gln Asn Leu His Glu Leu Thr
 1300 1305 1310

 Gln Asp Leu Asp Leu Asp His Phe Val Leu Phe Ser Ser Ile Val Gly
 1315 1320 1325

 Val Leu Gly Asn Ala Gly Gln Ala Asn Tyr Ala Ala Asn Ala Tyr
 1330 1335 1340

 Leu Asp Ala Leu Ala Glu His Arg Leu Ala Gln Gly Leu Pro Ala Thr
 345 1350 1355 1360

 Ser Val Ser Trp Gly Pro Gly Gln Ala Ala Ala Trp His Asp Ser Asp
 1365 1370 1375

 Ala Ala Asp Arg Met Ser Arg Asp Gly Leu Leu Pro Met Ala Ala Ala
 1380 1385 1390

 Pro Arg Arg Arg Pro Ala Pro Ala Leu Ala Gln Gly Met Thr Gln Val
 1395 1400 1405

 Thr Val Ala Asp Ile Asp Trp Ser Ala Tyr Ala Pro Ala Leu Thr Ala
 1410 1415 1420

 Val Arg Pro Ser Pro Leu Ile Gly Asp Leu Pro Glu Ala Arg Arg Ala
 425 1430 1435 1440

 Leu Gly Pro Ala Glu Gly Pro Arg Arg Glu Arg Ser Pro Leu Arg Asp
 1445 1450 1455

 Arg Ile Gly Ala Leu Pro Pro Ala Glu Gln Glu Lys Ala Phe Leu Thr
 1460 1465 1470

 Met Val Arg Glu Glu Ala Ala Arg Val Leu Gly His Pro Ser Pro Asp
 1475 1480 1485

 Thr Val Asp Ala Gln Arg Ala Phe Arg Glu Gln Gly Phe Asp Ser Leu
 1490 1495 1500

 Met Ala Val Asp Leu Arg Asn Arg Leu Ser Ala Ala Thr Gly Leu Arg
 505 1510 1515 1520

 Leu Pro Ala Thr Leu Leu Phe Asp His Pro Thr Pro Leu Ala Ala Ala
 1525 1530 1535

 Ala Cys Leu Arg Ser Glu Val Leu Gly Ala Ala Gly Pro Ala Thr Val
 1540 1545 1550

 Val Gln Ala Ser Thr Ala Ala Leu Asp Glu Pro Val Ala Ile Ile Gly
 1555 1560 1565

 Met Ala Cys Arg Phe Pro Gly Gly Val His Ser Pro Glu Ala Leu Trp
 1570 1575 1580

 Arg Leu Leu Ala Glu Gly Gly Asp Ala Ile Thr Pro Met Pro Ala Asp
 585 1590 1595 1600

 Arg Gly Trp Asp Leu Asp Arg Leu Tyr His Pro Asp Pro Asp His Gln
 1605 1610 1615

 Gly Thr Ser Tyr Ala Arg Gly Gly Phe Leu Asp Gly Ala Ala Asp

1620

1625

1630

Phe Asp Ala Asp Phe Phe Gly Ile Ser Pro Arg Glu Ala Leu Ala Met
 1635 1640 1645

Asp Pro Gln Gln Arg Leu Leu Leu Glu Thr Trp Glu Val Leu Glu Gln
 1650 1655 1660

Ala Gly Ile Asp Pro Glu Ser Leu Arg Gly Ser Ser Thr Gly Val Phe
 665 1670 1675 1680

Ala Gly Thr Asn Thr Gln Asp Tyr Gly Thr Ala Leu Asp Ala Ala Gln
 1685 1690 1695

Asp Glu Ala Gly Gly His Arg Leu Thr Gly Asn Ala Met Ser Val Val
 1700 1705 1710

Ser Gly Arg Val Ser Tyr Thr Phe Gly Phe Glu Gly Pro Ala Leu Thr
 1715 1720 1725

Val Asp Thr Ala Cys Ser Ser Leu Val Ala Leu His Met Ala Ala
 1730 1735 1740

Gln Ala Leu Arg Gln Gly Glu Cys Ser Leu Ala Val Ala Gly Gly Val
 745 1750 1755 1760

Thr Val Met Ala Thr Pro Ser Ser Phe Val Glu Phe Ala Arg Gln Arg
 1765 1770 1775

Gly Leu Ala Pro Asp Gly Arg Cys Lys Pro Phe Ala Ala Ala Asp
 1780 1785 1790

Gly Thr Gly Trp Ser Glu Gly Val Gly Leu Leu Leu Val Glu Arg Leu
 1795 1800 1805

Ser Asp Ala Arg Arg Asn Gly His Gln Val Leu Ala Val Val Arg Gly
 1810 1815 1820

Ser Ala Val Asn Gln Asp Gly Ala Ser Asn Gly Leu Ser Ala Pro Ser
 825 1830 1835 1840

Gly Pro Ser Gln Gln Arg Val Ile Arg Gln Ala Leu Ala Asn Ala Arg
 1845 1850 1855

Val Ala Ala Ser Glu Val Asp Ala Val Glu Ala His Gly Thr Gly Thr
 1860 1865 1870

Thr Leu Gly Asp Pro Ile Glu Ala Gln Ala Leu Leu Ala Thr Tyr Gly
 1875 1880 1885

Gln Glu Arg Pro Leu Leu Leu Gly Ala Val Lys Ser Asn Leu Gly His
 1890 1895 1900

Thr Gln Ala Ala Ala Gly Val Ala Gly Val Met Lys Met Val Leu Ala
 905 1910 1915 1920

Met Arg His Gly Met Leu Pro Arg Thr Leu His Val Asp Glu Pro Thr
 1925 1930 1935

Gly His Val Asp Trp Thr Ala Gly Ala Val Glu Leu Leu Thr Glu His
 1940 1945 1950

Thr Asp Trp Pro Glu Thr Gly His Pro Arg Arg Ala Ala Val Ser Ala
 1955 1960 1965
 Phe Gly Ile Ser Gly Thr Asn Ala His Val Val Leu Glu Leu Pro Ala
 1970 1975 1980
 Ala Glu Gln Pro Leu Val Glu Gln Pro Ser Ala Ala Glu Pro Asp Ala
 985 1990 1995 2000
 Pro Ala Thr Ala Pro Asp Arg Thr Pro Thr Ala Ser Asp Gly Thr Ala
 2005 2010 2015
 Pro Leu Leu Leu Ser Ala Lys Ser Glu Ser Ala Leu Arg Ala Gln Ala
 2020 2025 2030
 Ala Arg Leu His Ser His Leu Glu Arg Asp Pro Ala Leu Arg Leu Thr
 2035 2040 2045
 Asp Ala Ala Tyr Thr Leu Met Thr His Arg Thr Ala Phe Ala His Arg
 2050 2055 2060
 Ala Ala Val Arg Ala Ala Asp His Glu Ala Ala Leu Arg Ala Leu Thr
 065 2070 2075 2080
 Ala Leu Ala Ala Gly Glu Ala Asp Pro Ala Val Asp Thr Gly Thr Ala
 2085 2090 2095
 His Thr Gly Arg Asp Ala Val Leu Phe Ser Gly Gln Gly Ser Gln Arg
 2100 2105 2110
 Ile Gly Met Gly Arg Glu Leu Ser Gly Arg Tyr Pro Val Phe Ala Glu
 2115 2120 2125
 Ala Phe Asp Thr Val Cys Ala Ala Leu Asp Glu His Leu Asp Arg Pro
 2130 2135 2140
 Leu Arg Asp Val Val Arg Gly Glu Asp Glu Glu Leu Leu Asn Arg Thr
 145 2150 2155 2160
 Val Tyr Ala Gln Ala Gly Leu Phe Ala Ile Glu Val Ala Leu Phe Arg
 2165 2170 2175
 Leu Val Glu Ser Trp Gly Val Arg Pro His Tyr Val Ala Gly His Ser
 2180 2185 2190
 Val Gly Glu Ile Ala Ala His Val Ala Gly Val Phe Ser Leu Ala
 2195 2200 2205
 Asp Ala Cys Ala Leu Val Ala Ala Arg Gly Arg Leu Met Gln Ala Leu
 2210 2215 2220
 Pro Ala Gly Gly Ala Met Ala Ala Ile Arg Ala Thr Glu Asp Glu Val
 2225 2230 2235 2240
 Leu Pro His Leu Ala Asp Ser Val Ser Ile Ala Ala Val Asn Gly Pro
 2245 2250 2255
 Ser Ser Val Val Val Ser Gly Ala Glu His Ala Val Leu Ser Ile Ala
 2260 2265 2270

Ala His Phe Glu Gly Ala Gly Arg Lys Thr Thr Arg Leu Arg Val Ser
 2275 2280 2285

His Ala Phe His Ser Pro Leu Met Asp Pro Met Leu Ala Asp Phe Arg
 2290 2295 2300

Ala Val Ala Glu Gly Leu Thr Tyr Gly Glu Pro Glu Leu Ala Val Val
 305 2310 2315 2320

Ser Asn Val Thr Gly Gln Leu Ala Thr Pro Asp Gln Leu Arg Thr Pro
 2325 2330 2335

Glu Tyr Trp Val Thr His Val Arg Ala Ala Val Arg Phe Ala Asp Gly
 2340 2345 2350

Ile Arg Ala Leu Gly Ala Glu Gly Val Thr Arg Phe Leu Glu Leu Gly
 2355 2360 2365

Pro Asp Gly Val Leu Ser Ala Leu Ala Arg Glu Ser Ala Pro Asp Asp
 2370 2375 2380

Ala Val Cys Thr Pro Val Leu Arg Lys Asp Arg Ser Glu Ala Ala Thr
 385 2390 2395 2400

Leu Leu Ala Ala Leu Thr His Leu His Val His Gly Thr Glu Ile Asp
 2405 2410 2415

Trp Thr Ala Phe Leu Ala Gly Arg Asp Ala His Ala Val Asp Leu Pro
 2420 2425 2430

Thr Tyr Ala Phe Gln His Gln Arg Phe Trp Pro Thr Pro Asp His Thr
 2435 2440 2445

Arg Thr Gly Asp Leu Gly Ala Val Gly Leu Glu Ala Thr Gly His Pro
 2450 2455 2460

Leu Leu Ser Ala Ala Val Glu Leu Pro Asp Gly Glu Gly Leu Leu Phe
 465 2470 2475 2480

Thr Thr Arg Leu Ser Leu Gln Thr His Pro Trp Leu Ala Gly His Val
 2485 2490 2495

Val Met Gly Ser Val Leu Leu Pro Gly Thr Ala Phe Ala Glu Leu Ala
 2500 2505 2510

Leu Arg Ala Ala Asp Glu Val Gly Cys Asp Arg Val Asp Glu Leu Thr
 2515 2520 2525

Leu Ala Ala Pro Leu Val Leu Pro Glu His Gly Gly Val Gln Leu Gln
 2530 2535 2540

Leu Arg Val Gly Pro Ala Asp Ala Ser Gly Arg Arg Thr Leu Thr Ala
 545 2550 2555 2560

Arg Ser Arg Ala Glu Gly Asp Gly Asp Arg Pro Trp Val Gln His Ala
 2565 2570 2575

Thr Gly Val Leu Ala Glu Gly Glu Ser Thr Pro Glu Pro Gly Tyr Asp
 2580 2585 2590

Phe His Thr Glu Ser Trp Pro Pro Ala Asp Ala Ala Pro Val Glu Leu

2595	2600	2605
Ser Gly Leu Tyr Pro Asp Phe Ala Ala His Gly Phe Asp Tyr Gly Pro		
2610	2615	2620
His Phe Gln Gly Leu Arg Thr Ala Trp Arg Arg Gly Asp Glu Val Phe		
625	2630	2635
Ala Glu Val Ala Leu Pro Ala Glu Ala Glu Gly Glu Ala Ser Ala Tyr		
2645	2650	2655
Gly Leu His Pro Ala Leu Leu Asp Ala Ala Leu His Val Val Ala Phe		
2660	2665	2670
Asn Gly Val Asp Arg Gly Val Val Pro Phe Ser Trp Glu Ser Val Ala		
2675	2680	2685
Leu His Ala Thr Gly Ala Ser Ala Val Arg Ile Arg Val Val Arg His		
2690	2695	2700
Ser Gly Asp Thr Val Ser Val Asp Val Ala Asp Thr Thr Gly Glu Pro		
705	2710	2715
720		
Val Ala Ser Ile Gly Thr Leu Val Leu Arg Ala Val Ser Ala Asp Gln		
2725	2730	2735
Leu Ala Gly Gly Ala Asp Pro Ala Val Arg Asp Ala Leu Phe Arg Val		
2740	2745	2750
Gln Trp Asn Pro Val Arg Leu Pro Pro Ala Gly Ala Ala Val Thr Val		
2755	2760	2765
Ala Thr Leu Gly Ser Leu Ala Gly Ala Pro Phe Asp Gly Tyr Pro Asp		
2770	2775	2780
Leu Ala Ser Leu Ala Arg Ser Gly Arg Val Ala Gly Ala Val Leu Val		
785	2790	2795
2800		
Pro Val Glu Ala Gly Ala Gly Glu Val Val Ala Asp Asp Val Val Gly		
2805	2810	2815
Ala Thr His Ala Thr Ala Ala Arg Ala Leu Asp Leu Ala Arg Ser Trp		
2820	2825	2830
Leu Ala Asp Asp Arg Phe Ala Ala Ser Arg Leu Val Phe Val Thr Arg		
2835	2840	2845
Gly Ala Val Ser Gly Ala Asp Leu Ala Gly Ala Ala Val Trp Gly Leu		
2850	2855	2860
Val Arg Ser Ala Leu Ser Glu His Pro Gly Arg Phe Gly Leu Val Asp		
865	2870	2875
2880		
Leu Asp Asp Asp Ala Glu Leu Ala Leu Val Pro Arg Val Leu Ala Ser		
2885	2890	2895
Asp Glu Pro Gln Leu Leu Val Arg Gly Gly Glu Val Leu Ala Ala Arg		
2900	2905	2910
Leu Ala Arg Ala Gln Ser Ser His Ala Val Thr Trp Asp Pro Ser Gly		
2915	2920	2925

Thr Val Leu Val Thr Gly Gly Thr Gly Gly Leu Gly Arg Val Met Ala
 2930 2935 2940
 Arg His Leu Val Val Glu His Gly Val Arg Asn Leu Leu Leu Val Ser
 945 2950 2955 2960
 Arg Arg Gly Pro Ala Ala Glu Gly Ala Glu Glu Leu Val Thr Glu Leu
 2965 2970 2975
 Arg His Ser Gly Ala Glu Val Ala Val Glu Ala Cys Asp Val Thr Asp
 2980 2985 2990
 Ala Ala Ala Val Ala Asp Leu Val Ala Arg His Ile Ser Ala Val
 2995 3000 3005
 Val His Thr Ala Gly Val Leu Asp Asp Gly Val Val Glu Ser Leu Thr
 3010 3015 3020
 Pro Glu Arg Leu Ser Ala Val Leu Arg Pro Lys Val Asp Ala Ala Trp
 025 3030 3035 3040
 Asn Leu His Glu Ala Thr Arg Asp Leu Asp Leu Asp Ala Phe Val Val
 3045 3050 3055
 Phe Ser Ser Val Ala Gly Thr Ile Gly Ser Pro Gly Gln Ala Asn Tyr
 3060 3065 3070
 Ala Ala Gly Asn Ala Phe Leu Asp Ala Leu Ala His His Arg Arg Ala
 3075 3080 3085
 Ala Gly Leu Pro Ala Ala Ser Leu Ala Trp Gly Pro Trp Ser Arg Asp
 3090 3095 3100
 Gly Gly Met Thr Gly Thr Leu Thr Asp Val Asp Ser Ser Ala Ser Pro
 105 3110 3115 3120
 Gly Arg His Ala Arg Thr His Pro Arg Thr Gly Arg Gly Leu Phe Asp
 3125 3130 3135
 Ala Ala Leu Ala Ala Gly Asp Ala His Leu Leu Pro Val Arg Phe Asp
 3140 3145 3150
 Trp Ala Ser Leu Arg Ala Gln Gly Glu Val Pro Pro Leu Leu Arg Gly
 3155 3160 3165
 Leu Ile Arg Thr Arg Ala Arg Arg Ser Ala Val Gly Gly Ser Ala Ala
 3170 3175 3180
 Ala Ala Gly Leu Val Gly Arg Leu Ser Gly Arg Gly Thr Val Glu Arg
 185 3190 3195 3200
 Arg Glu Val Leu Leu Asp Leu Val Arg Ala Gln Ile Ala Val Val Leu
 3205 3210 3215
 Gly His Ala Asn Pro Glu Thr Ile Glu Ser Thr Arg Val Phe Gln Asp
 3220 3225 3230
 Leu Gly Phe Asp Ser Leu Thr Ala Val Glu Leu Arg Asn Arg Leu Asn
 3235 3240 3245

Asn Ala Thr Gly Leu Arg Leu Ser Ala Thr Ala Val Phe Asp Tyr Pro
 3250 3255 3260

 Thr Ala Asp Ala Leu Val Asp Phe Leu Leu Asp Glu Leu Phe Gly Ala
 265 3270 3275 3280

 Gln Glu Ala Glu Leu Pro Ala Pro Val Pro Ser Pro Ala Gly Ala
 3285 3290 3295

 Ala Asp Asp Pro Val Val Ile Val Gly Met Ser Cys Arg Tyr Pro Gly
 3300 3305 3310

 Gly Val Gly Ser Pro Glu Asp Leu Trp Arg Leu Val Ser Glu Gly Val
 3315 3320 3325

 Asp Ala Val Ser Asp Phe Pro Thr Asp Arg Gly Trp Asp Val Glu Ser
 3330 3335 3340

 Leu Tyr Ser Pro Asp Pro Glu Ala Leu Gly Thr Ser Tyr Thr Arg Ser
 345 3350 3355 3360

 Gly Gly Phe Leu His Glu Ala Ala Glu Phe Asp Pro Asp Phe Phe Gly
 3365 3370 3375

 Met Ser Pro Arg Glu Ala Leu Ala Thr Asp Ala Gln Gln Arg Leu Leu
 3380 3385 3390

 Leu Glu Thr Thr Trp Glu Ala Ile Glu Arg Thr Gly Ile Asp Pro Ala
 3395 3400 3405

 Ser Leu Arg Gly Ser Arg Thr Gly Val Phe Ala Gly Val Met Tyr Thr
 3410 3415 3420

 Asp Tyr Gly Asp Leu Leu Val Gly Asp Gln Phe Glu Gly Tyr Arg Ser
 425 3430 3435 3440

 Asn Gly Ser Ala Ala Ser Ile Ala Ser Gly Arg Val Ser Tyr Thr Phe
 3445 3450 3455

 Gly Phe Glu Gly Pro Ala Val Thr Val Asp Thr Ala Cys Ser Ser Ser
 3460 3465 3470

 Leu Val Ala Leu His Trp Ala Ala Gln Ser Leu Arg Ser Gly Glu Cys
 3475 3480 3485

 Ser Leu Ala Val Ala Gly Gly Val Thr Val Met Ser Thr Pro Thr Thr
 3490 3495 3500

 Phe Val Glu Phe Ser Arg Gln Arg Gly Leu Ser Ala Asp Gly Arg Cys
 505 3510 3515 3520

 Lys Ala Phe Ala Asp Ala Ala Asp Gly Val Gly Trp Gly Glu Gly Val
 3525 3530 3535

 Gly Met Leu Val Leu Glu Arg Leu Ser Asp Ala Arg Arg Asn Gly His
 3540 3545 3550

 Arg Val Leu Ala Val Val Arg Gly Ser Ala Val Asn Gln Asp Gly Ala
 3555 3560 3565

 Ser Asn Gly Leu Thr Ala Pro Asn Gly Pro Ala Gln Gln Arg Val Ile

3570	3575	3580
Arg Gln Ala Leu Ala Ser Ala Gly Leu Ser Ala Ala Asp Val Asp Ala		
585	3590	3595
3600		
Val Glu Ala His Gly Thr Gly Thr Thr Leu Gly Asp Pro Ile Glu Ala		
3605	3610	3615
Gln Ala Leu Leu Ala Thr Tyr Gly Gln Glu Arg Pro Glu Asp Arg Pro		
3620	3625	3630
Leu Leu Leu Gly Ser Val Lys Ser Asn Ile Gly His Ala Gln Ala Ala		
3635	3640	3645
Ser Gly Val Ala Gly Val Ile Lys Met Val Leu Ala Met Arg His Gly		
3650	3655	3660
Val Leu Pro Arg Thr Leu His Val Asp Glu Pro Ser Ser His Val Asp		
665	3670	3675
3680		
Trp Ser Ala Gly Ala Val Glu Leu Leu Thr Ser Glu Ala Glu Trp Pro		
3685	3690	3695
Gln Gly Glu Gly Pro Arg Arg Ala Gly Val Ser Ser Phe Gly Val Ser		
3700	3705	3710
Gly Thr Asn Ala His Val Ile Leu Glu Gln Pro Gly Pro Asp Ala Ala		
3715	3720	3725
Asp Ala Ala Pro Asp Ala Thr Val Thr Asp Pro Gly Ala Leu Ala Trp		
3730	3735	3740
Val Leu Ser Ala Arg Asn Glu Ala Ala Leu Arg Cys Gln Ala Ala Arg		
745	3750	3755
3760		
Leu Leu Ser Leu Val Ala Gly Ser Asp Ala Leu Cys Ala Arg Asp Ile		
3765	3770	3775
Gly His Ser Leu Val Thr Gly Arg Ser Ser Phe Ala His Arg Ala Val		
3780	3785	3790
Val Trp Gly Gln Asp Arg Asp Ala Leu Val Arg Ala Leu Ser Ala Leu		
3795	3800	3805
Ala Val Gly Glu Ala Asp Ala Gly Leu Ala Glu Gly Ala Ser Gly Ala		
3810	3815	3820
Gly Arg Thr Ala Phe Leu Phe Ser Gly Gln Gly Ser Gln Arg Leu Gly		
825	3830	3835
3840		
Met Gly Trp Glu Leu Tyr Ala Arg Tyr Pro Val Phe Ala Asp Ala Phe		
3845	3850	3855
Asp Ala Val Cys Ala Ala Leu Asp Glu His Leu Glu Arg Pro Leu Arg		
3860	3865	3870
Asp Val Val Trp Gly Glu Asp Ala Glu Leu Leu Asn Gln Thr Ala Tyr		
3875	3880	3885
Ala Gln Ala Gly Leu Phe Ala Ile Glu Val Ala Leu Tyr Arg Leu Ala		
3890	3895	3900

Glu Ser Trp Gly Met Arg Pro Asp Phe Val Ala Gly His Ser Ile Gly
 905 3910 3915 3920

 Glu Val Ala Ala Ala His Val Ser Gly Val Phe Ser Leu Pro Asp Ala
 3925 3930 3935

 Cys Ala Leu Val Ala Ala Arg Gly Arg Leu Met Gln Gln Leu Pro Ser
 3940 3945 3950

 Gly Gly Ala Met Met Ala Ile Arg Ala Thr Glu Asp Glu Val Leu Pro
 3955 3960 3965

 His Leu Ala Glu Gly Val Ser Leu Ala Ala Val Asn Gly Pro Ser Ser
 3970 3975 3980

 Val Val Ile Ser Gly Ala Glu Asp Ala Val Leu Ala Ile Ala Ala His
 3985 3990 3995 4000

 Phe Ala Gly Glu Gly Arg Lys Thr Thr Arg Leu Arg Val Ser His Ala
 4005 4010 4015

 Phe His Ser Pro Leu Met Glu Pro Met Leu Glu Glu Phe Arg Ala Val
 4020 4025 4030

 Val Thr Arg Leu Ser Phe Gly Thr Pro Thr Ile Pro Val Val Ser Asn
 4035 4040 4045

 Leu Thr Gly Arg Leu Ala Glu Pro Glu Gln Leu Ala His Ala Asp Tyr
 4050 4055 4060

 Trp Val Arg His Val Arg Glu Ala Val Arg Phe Ala Asp Gly Ile Gln
 4065 4070 4075 4080

 Ala Leu Arg Ala Glu Gly Val Thr Arg Phe Leu Glu Leu Gly Pro Asp
 4085 4090 4095

 Gly Val Leu Ser Ala Met Ala Arg Glu Ser Ala Ser Asp Asp Ala Val
 4100 4105 4110

 Leu Ala Pro Val Leu Arg Arg Asp Arg Pro Glu Glu Thr Ala Leu Leu
 4115 4120 4125

 Gly Ala Leu Ala Gln Leu Tyr Val Arg Gly Ala His Val Asp Trp Thr
 4130 4135 4140

 Val Pro Phe Ala Gly Ser Gly Ala Arg Trp Ala Asp Leu Pro Thr Tyr
 4145 4150 4155 4160

 Ala Phe Gln His Glu Arg Phe Trp Pro Ser Gly Gly Val Ala Arg Pro
 4165 4170 4175

 Gly Asp Val Arg Ser Ala Gly Leu Gly Ser Ala Gly His Pro Leu Leu
 4180 4185 4190

 Gly Ala Ala Val Glu Leu Ala Gly Ser Gly Gly Leu Leu Phe Thr Gly
 4195 4200 4205

 Arg Leu Ser Val Ser Ser His Pro Trp Leu Ala Asp His Val Val Leu
 4210 4215 4220

Gly Ser Val Leu Val Pro Gly Thr Ala Leu Val Glu Leu Val Leu Arg
 225 4230 4235 4240

 Ala Ala Asp Glu Ala Gly Cys Asp Leu Leu Glu Glu Leu Thr Leu Ala
 4245 4250 4255

 Ala Pro Leu Val Leu Pro Ala Ser Gly Ala Ala Val Gln Val Gln Val
 4260 4265 4270

 Ala Val Gly Glu Pro Asp Glu Ala Gly Arg Arg Pro Val Ser Val His
 4275 4280 4285

 Ala Arg Glu Gly Glu Gly Pro Trp Thr Leu His Ala Ser Gly Ala Val
 4290 4295 4300

 Thr Ser Gly Ala Glu Val Pro Pro Phe Asp Ala Thr Val Trp Pro Pro
 305 4310 4315 4320

 Lys Gly Ala Glu Pro Val Asp Val Ala Asp Cys Tyr Asp Val Leu Ala
 4325 4330 4335

 Asp Ala Gly Leu Thr Tyr Gly Pro Ala Phe His Gly Leu Gln Ala Ala
 4340 4345 4350

 Trp Lys Leu Gly Gly Asp Val Tyr Ala Glu Ala Lys Leu Pro Glu Ser
 4355 4360 4365

 Thr Asp Gly Asp Ala Tyr Gly Leu His Pro Ala Leu Phe Asp Ala Ala
 4370 4375 4380

 Leu His Ala Ser Ala Leu Gly Gly Ala Glu Ala Gly Gly Val Pro Phe
 385 4390 4395 4400

 Ser Trp Ala Gly Val Ser Leu His Ala Thr Gly Ala Ser His Leu Arg
 4405 4410 4415

 Val Arg Ile Arg Glu Ala Gly Gly Ala Leu Ser Val Ala Ile Ala Asp
 4420 4425 4430

 Thr Ser Gly Ala Pro Val Ala Ser Val Glu Ser Leu Val Ile Arg Pro
 4435 4440 4445

 Leu Ser Ala Gly Gln Val Gln Ala Ala Asp Arg Asp Ala Leu Phe Lys
 4450 4455 4460

 Ala Asp Trp Val Pro Val Pro Leu Thr Asp Glu Arg Val Glu Pro Gly
 4465 4470 4475 4480

 Thr Gly Pro Glu Gly Glu Pro Leu Arg Thr Tyr Ala Asp Leu Asp Ser
 4485 4490 4495

 Leu Glu Gly Ala Ala Val Pro Gly Thr Val Leu Val Ala Pro Pro Ser
 4500 4505 4510

 Gly Ala Ala Gly Thr Val Glu Ser Val His Ala Ala Thr Val Trp Ala
 4515 4520 4525

 Leu Glu Met Val Gln Ala Trp Leu Ala Asp Asp Arg Phe Ala Thr Ser
 4530 4535 4540

 Arg Leu Val Phe Val Thr Arg Gly Ala Ala Phe Gly Ala Asp Leu Ala

545	4550	4555	4560
Ala Ala Ala Val Arg Gly Leu Val Arg Ser Ala Gln Ser Glu Asn Pro			
4565	4570	4575	
Gly Arg Phe Gly Leu Val Asp Met Asp Gly Asp Ala Asp Thr Thr Val			
4580	4585	4590	
Pro Ala Gln Ala Leu Ala Thr Asp Glu Pro Glu Leu Leu Val Arg Gly			
4595	4600	4605	
Gly Glu Val Leu Ala Ala Arg Leu Val Arg Ala Gln Ser Ser His Thr			
4610	4615	4620	
Val Thr Trp Asp Pro Ser Gly Thr Val Leu Ile Thr Gly Gly Thr Gly			
625	4630	4635	4640
Gly Leu Gly Arg Ser Val Ala Arg His Leu Val Ser Glu His Gly Val			
4645	4650	4655	
Arg Ser Leu Leu Leu Val Ser Arg Arg Gly Pro Ala Ala Glu Gly Ala			
4660	4665	4670	
Gly Glu Leu Val Ala Glu Leu Arg Gly Ser Gly Ala Glu Val Val Ile			
4675	4680	4685	
Glu Ala Cys Asp Val Thr Asp Ala Val Ala Val Ala Asp Leu Val Ala			
4690	4695	4700	
Arg His Arg Ile Ser Ala Val Val His Thr Ala Gly Val Leu Asp Asp			
705	4710	4715	4720
Gly Val Val Glu Ser Leu Thr Pro Glu Arg Leu Ala Val Val Leu Arg			
4725	4730	4735	
Pro Lys Val Asp Ala Ala Trp Asn Leu His Glu Ala Thr Arg Gly Leu			
4740	4745	4750	
Asp Leu Asp Ala Phe Val Val Phe Ser Ser Val Ala Gly Thr Phe Gly			
4755	4760	4765	
Ser Ala Gly Gln Ala Asn Tyr Ala Ala Gly Asn Ala Phe Leu Asp Ala			
4770	4775	4780	
Leu Ala Tyr His Arg Arg Ala Val Gly Leu Pro Ala Val Ser Leu Ala			
785	4790	4795	4800
Trp Gly Pro Trp Ser Gln Asp Gly Gly Met Thr Gly Thr Leu Ser Asp			
4805	4810	4815	
Ala Asp Val Gln Arg Ile Ala Arg Gln Gly Met Pro Pro Leu Thr Val			
4820	4825	4830	
Glu Glu Gly Leu Ala Leu Phe Asp Ala Ala Leu Gly Ser Ala Glu Pro			
4835	4840	4845	
Met Ala Leu Pro Val Arg Leu Asp Leu Ala Ala Leu Arg Ala Gln Gly			
4850	4855	4860	
Glu Pro Gln Pro Leu Leu Arg Gly Leu Ile Arg Thr Arg Thr Arg Arg			
865	4870	4875	4880

Ser Gly Ala Ala Ala Ala Ser Gly Ile Ala Gln Arg Leu Ala Gly Leu
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 Ser Thr Ala Glu Arg Arg Glu Ala Leu Leu Asp Val Val Arg Ala Gln
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 Ile Ala Thr Val Leu Gly His Ala Gly Pro Glu Thr Ile Ala Pro Asp
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 Arg Ala Phe Gln Asp Leu Gly Leu Asp Ser Leu Thr Ala Ile Glu Leu
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 Arg Asn Leu Leu Gly Lys Ala Thr Gly Leu Arg Leu Pro Ala Thr Thr
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 Val Phe Asp Tyr Pro Thr Val Asp Ala Leu Ala Ala His Leu Leu Asp
 4965 4970 4975
 Glu Leu Phe Gly Ala Glu Thr Gly Thr Ala Thr Glu Thr Pro Leu Pro
 4980 4985 4990
 Val Pro Gly Leu Pro Ser Leu Ala Asp Asp Pro Val Val Ile Val Gly
 4995 5000 5005
 Met Ser Cys Arg Phe Pro Gly Gly Val Ala Ser Pro Glu Asp Leu Trp
 5010 5015 5020
 Arg Leu Val Ala Asp Gly Val Asp Ala Val Ser Ala Phe Pro Thr Asp
 025 5030 5035 5040
 Arg Gly Trp Glu Ile Asp Asp Thr Tyr Asp Pro Glu Arg Glu Gly Ala
 5045 5050 5055
 Ile Ala Thr Arg Ser Gly Gly Phe Leu His Asp Ala Ala Glu Phe Asp
 5060 5065 5070
 Pro Glu Phe Phe Gly Met Ser Pro Arg Glu Ala Leu Thr Thr Asp Ala
 5075 5080 5085
 Gln Gln Arg Leu Leu Leu Glu Thr Thr Trp Glu Ala Leu Glu Arg Ala
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 Gly Met Asp Pro Ala Thr Leu Arg Gly Ser Arg Thr Gly Val Phe Ala
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 Gly Val Met Tyr His Asp Tyr Ser Thr Leu Leu Ser Gly Arg Glu Phe
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 Glu Gly Tyr Gln Gly Ser Gly Ser Ala Gly Ser Val Ala Ser Gly Arg
 5140 5145 5150
 Val Ser Tyr Thr Phe Gly Phe Glu Gly Pro Ala Val Thr Val Asp Thr
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 Ala Cys Ser Ser Ser Leu Val Ala Leu His Leu Ala Ala Gln Ser Leu
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 Arg Ser Gly Glu Cys Ser Leu Ala Leu Ala Gly Gly Val Thr Val Met
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Ser Thr Pro Leu Thr Phe Val Glu Phe Ser Arg Gln Gly Gly Leu Ser
 5205 5210 5215
 Ala Asp Gly Arg Cys Lys Ala Phe Ala Asp Ala Ala Asp Gly Val Gly
 5220 5225 5230
 Trp Ala Glu Gly Ala Gly Ile Leu Val Leu Glu Arg Leu Ser Asp Ala
 5235 5240 5245
 Arg Arg Asn Gly His Arg Ile Leu Ala Thr Val Arg Gly Ser Ala Val
 5250 5255 5260
 Asn Gln Asp Gly Ala Ser Asn Gly Leu Thr Ala Pro Asn Gly Pro Ala
 265 5270 5275 5280
 Gln Gln Arg Val Ile Arg Gln Ala Leu Ala Ser Ala Gly Leu Ser Ala
 5285 5290 5295
 Ala Asp Val Asp Ala Val Glu Ala His Gly Thr Gly Thr Thr Leu Gly
 5300 5305 5310
 Asp Pro Ile Glu Ala Gln Ala Leu Leu Ala Thr Tyr Gly Gln Glu Arg
 5315 5320 5325
 Pro Glu Asp Arg Pro Leu Leu Leu Gly Ser Val Lys Ser Asn Ile Gly
 5330 5335 5340
 His Ala Gln Ala Ala Ser Gly Val Ala Gly Val Ile Lys Met Val Leu
 345 5350 5355 5360
 Ala Met Arg His Gly Val Leu Pro Arg Thr Leu His Val Asp Glu Pro
 5365 5370 5375
 Ser Ser His Val Asp Trp Ser Ala Gly Ala Val Glu Leu Leu Thr Ser
 5380 5385 5390
 Glu Ala Glu Trp Pro Gln Gly Glu Gly Pro Arg Arg Ala Gly Val Ser
 5395 5400 5405
 Ser Phe Gly Ile Ser Gly Thr Asn Ala His Val Ile Leu Glu Gln Pro
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 Glu Pro Val Ala Ala Glu Thr Glu Ser Ile Thr Pro Asp Thr Ala Pro
 425 5430 5435 5440
 Asp Ala Ala Glu Asp Glu Ala Ala Asp Ser Gly Thr Pro Val Pro Ala
 5445 5450 5455
 Leu Leu Ser Gly Arg Ser Ala Ser Ala Leu Arg Ala Gln Ala Ala Arg
 5460 5465 5470
 Leu Leu Ser Arg Leu Asp Gly Asp Pro Gly Pro Arg Ile Thr Asp Val
 5475 5480 5485
 Ala Tyr Ser Leu Ala Thr Gly Arg Ser Ala Phe Pro His Arg Ala Val
 5490 5495 5500
 Ile Leu Ala Ala Asn Arg Ala Asp Leu Leu His Ser Leu Ser Ala Leu
 5505 5510 5515 5520
 Ala Glu Gly His Thr Glu Ala Pro Ala Val Val Ala Gln Asp Arg Ala

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Arg Ser Gly Lys Leu Ala Phe Leu Phe Ser Gly Gln Gly Ser Gln Arg		
5540	5545	5550
Leu Gly Met Gly Arg Glu Leu Tyr Gly Arg Tyr Pro Ala Phe Ala Glu		
5555	5560	5565
Ala Leu Asp Ala Val Cys Ala Ala Leu Asp Ala His Leu Asp Arg Pro		
5570	5575	5580
Leu Arg Asp Val Ile Trp Gly Glu Asp Ala Glu Leu Leu Asn Arg Thr		
5585	5590	5595
Gly Tyr Ala Gln Thr Gly Leu Phe Ala Ile Glu Val Ala Leu Phe Arg		
5605	5610	5615
Leu Leu Glu Ser Trp Gly Val Arg Pro Asp His Leu Leu Gly His Ser		
5620	5625	5630
Ile Gly Glu Ile Ala Ala His Val Ala Gly Val Leu Ser Leu Pro		
5635	5640	5645
Asp Ala Cys Ala Leu Val Ala Ala Arg Gly Arg Leu Met Gln Gln Leu		
5650	5655	5660
Pro Ser Gly Gly Ala Met Met Ala Ile Arg Ala Thr Glu Asp Glu Val		
5665	5670	5675
Leu Pro His Leu Ala Glu Gly Val Ser Leu Ala Ala Val Asn Gly Pro		
5685	5690	5695
Ser Ser Val Val Val Ser Gly Ala Glu Asp Glu Val Leu Ala Leu Ala		
5700	5705	5710
Ala His Phe Glu Glu Gly Arg Lys Thr Thr Arg Leu Arg Val Ser		
5715	5720	5725
His Ala Phe His Ser Pro Leu Met Glu Pro Met Leu Ala Asp Phe Arg		
5730	5735	5740
Ala Val Ala Asp Gly Met Thr Tyr Ala Ala Pro Arg Ile Pro Val Val		
745	5750	5755
Ser Asn Val Thr Gly Arg Pro Ala Thr Ala Glu Glu Leu Cys Cys Ala		
5765	5770	5775
Glu Tyr Trp Val Gly His Val Arg Glu Ala Val Arg Phe Ala Asp Gly		
5780	5785	5790
Val Gly Ala Leu Arg Glu Gln Gly Val Thr Thr Phe Leu Glu Leu Gly		
5795	5800	5805
Pro Asp Gly Ser Leu Ser Ala Leu Ala Ala Glu Ser Ala Ala Asp Asp		
5810	5815	5820
Ser Val Leu Ala Pro Val Leu Arg Lys Asn Arg Pro Glu Ala Pro Ala		
825	5830	5835
Leu Leu Thr Ala Leu Ala Arg Leu His Ala Gln Gly Thr Pro Val Asp		
5845	5850	5855

Trp Ser Ala Ala Phe Ala Gly Thr Gly Ala Arg Trp Val Asp Leu Pro
 5860 5865 5870

 Thr Tyr Ala Phe Gln His Glu Arg Phe Trp Pro Ser Gly Gly Ala Ala
 5875 5880 5885

 Arg Ala Gly Asp Val Arg Ser Ala Gly Leu Gly Ser Ala Gly His Pro
 5890 5895 5900

 Leu Leu Gly Ala Ala Val Glu Leu Ala Gly Ser Gly Gly Arg Leu Leu
 905 5910 5915 5920

 Thr Gly Arg Leu Ser Leu Ser Ser His Pro Trp Leu Ala Asp His Val
 5925 5930 5935

 Val Leu Gly Ser Val Leu Val Pro Gly Thr Ala Leu Met Glu Leu Val
 5940 5945 5950

 Leu Arg Ala Ala Asp Glu Val Asp Cys Ala Ala Val Asp Glu Leu Thr
 5955 5960 5965

 Leu Ala Ala Pro Leu Val Leu Pro Ala Ser Gly Ala Ala Ile Gln Val
 5970 5975 5980

 Gln Val Trp Val Gly Glu Pro Asp Glu Ala Gly Arg Arg Pro Val Ser
 985 5990 5995 6000

 Val His Ala Arg Glu Gly Glu Gly Pro Trp Thr Leu His Ala Asp Gly
 6005 6010 6015

 Ala Leu Ala Pro Ala Ala Glu Thr Val Pro Phe Asp Thr Ala Ile Trp
 6020 6025 6030

 Pro Pro Gln Gly Ala Glu His Leu Asp Ala Ala Gly Cys Tyr Glu Arg
 6035 6040 6045

 Phe Ala Asp Ala Gly Phe Ala Tyr Gly Pro Val Phe Gln Gly Leu Arg
 6050 6055 6060

 Ala Ala Trp Lys Leu Gly Glu Asp Ile Tyr Ala Glu Val Ala Leu Pro
 6065 6070 6075 6080

 Glu Gly Thr Asp Gly Asn Ala Tyr Gly Leu His Pro Ala Leu Phe Asp
 6085 6090 6095

 Ala Ala Leu His Ala Ala Leu Leu Gly Gly Glu Gly Thr Asp Glu Ala
 6100 6105 6110

 Ala Val Pro Phe Ser Trp Asn Gly Val Thr Leu His Ala Thr Gly Ala
 6115 6120 6125

 Ser Arg Val Arg Val Arg Ile Arg Pro Thr Glu Gly Gly Thr Ser Ile
 6130 6135 6140

 Ala Leu Val Asp Thr Ala Gly Ala Pro Val Ala Ser Val Arg Ser Leu
 145 6150 6155 6160

 Thr Ala Arg Pro Ile Thr Ala Gly Gln Leu Gln Thr Gly Asp Arg Asp
 6165 6170 6175

Ser Leu Phe Gln Val Asp Trp Thr Thr Leu His Leu Thr Asp Glu Arg
 6180 6185 6190
 Ala Asn Ser Leu Ala Leu Leu Gly Lys Asp Thr Glu Gly Ile Leu Asp
 6195 6200 6205
 Thr Leu Ser Leu Gln Pro His Ala Asp Leu Asp Asp Leu Ala Ala Thr
 6210 6215 6220
 Gly Val His Asp Thr Val Leu Ala Pro Leu Pro Thr Arg Thr Ala Gly
 225 6230 6235 6240
 Thr Val Glu Ser Val His Ala Ala Thr Thr Gly Ala Leu Ala Leu Ile
 6245 6250 6255
 Arg Ser Trp Leu Ala Asp Asp Arg Phe Ala Ala Ser Arg Leu Val Phe
 6260 6265 6270
 Val Thr Arg Gly Ala Val Ser Gly Thr Asp Leu Ala Gly Ala Ser Val
 6275 6280 6285
 Trp Gly Leu Val Arg Ser Ala Leu Leu Glu His Pro Gly Arg Phe Gly
 6290 6295 6300
 Leu Val Asp Val Asp Val Asp Gln Asp Ala Glu Val Pro Leu Val Pro
 305 6310 6315 6320
 Arg Ala Leu Ala Ser Asp Glu Pro Gln Val Leu Val Arg Gly Gly Glu
 6325 6330 6335
 Val Leu Ala Ala Arg Leu Val Arg Ala Gln Ser Ser Asp Thr Val Thr
 6340 6345 6350
 Trp Asp Pro Ser Gly Thr Val Leu Ile Thr Gly Gly Thr Gly Gly Leu
 6355 6360 6365
 Gly Arg Ser Val Ala Arg His Leu Val Ser Glu His Gly Val Arg Ser
 6370 6375 6380
 Leu Leu Leu Val Ser Arg Arg Gly Pro Ala Ala Glu Gly Val Asp Ala
 385 6390 6395 6400
 Leu Val Ala Glu Leu Ala Glu Cys Gly Ala Gln Val Thr Val Glu Ala
 6405 6410 6415
 Cys Asp Val Thr Asp Ala Val Ala Asp Leu Val Ala Arg His
 6420 6425 6430
 Arg Ile Ser Ala Val Val His Thr Ala Gly Val Leu Asp Asp Gly Val
 6435 6440 6445
 Val Glu Ser Leu Thr Pro Glu Arg Leu Ser Ala Val Leu Arg Pro Lys
 6450 6455 6460
 Val Asp Ala Ala Trp Asn Leu His Glu Ala Thr Arg Gly Leu Asp Leu
 465 6470 6475 6480
 Asp Ala Phe Val Val Phe Ser Ser Val Ala Gly Thr Phe Gly Ser Ala
 6485 6490 6495
 Gly Gln Ala Asn Tyr Ala Ala Gly Asn Ala Phe Leu Asp Ala Leu Ala

6500

6505

6510

Tyr His Arg Arg Ala Val Gly Leu Pro Ala Val Ser Leu Ala Trp Gly
 6515 6520 6525

Pro Trp Ser Gln Asp Gly Gly Met Thr Gly Thr Leu Ser Asp Ala Asp
 6530 6535 6540

Val Gln Arg Ile Ala Arg Gln Gly Met Pro Pro Leu Thr Val Glu Glu
 545 6550 6555 6560

Gly Leu Ala Leu Phe Asp Ala Ala Leu Gly Ser Ala Glu Pro Met Ala
 6565 6570 6575

Leu Pro Val Arg Leu Asp Leu Ala Ala Leu Arg Ala Gln Gly Glu Pro
 6580 6585 6590

Gln Pro Leu Leu Arg Gly Leu Ile Arg Thr Pro Gly Arg Arg Thr Ala
 6595 6600 6605

Ala Ala Ala Thr Glu Gly Asp Thr Ala Ala Ala Phe Ala Gly Arg Leu
 6610 6615 6620

Thr Gly Leu Ser Ala Ala Glu Gly Arg Glu Val Val Leu Gly Ala Val
 625 6630 6635 6640

Arg Ser Gln Ile Ala Gly Val Leu Gly His Ala Glu Ala Thr Glu Ile
 6645 6650 6655

Asp Gln Asp Arg Ala Phe Leu Asp Leu Gly Phe Asp Ser Leu Thr Ala
 6660 6665 6670

Val Glu Leu Arg Asn Arg Leu Gly Ala Val Thr Gly Ile Arg Leu Pro
 6675 6680 6685

Ala Thr Leu Leu Phe Asp Tyr Pro Thr Pro Ala Glu Leu Val Ala His
 6690 6695 6700

Leu His Ala Arg Ile Ala Pro Glu Pro Thr Val Gly Pro Glu Ala Leu
 705 6710 6715 6720

Leu Gly Glu Leu Glu Arg Met Glu Lys Ser Phe Gly Gly Leu Asp Leu
 6725 6730 6735

Thr Glu Glu Met His Glu Gln Ile Ala Gly Arg Leu Glu Val Leu Arg
 6740 6745 6750

Ala Lys Trp Asp Ala Leu Arg Asp Thr Ala Ala Ala Gly His Asp
 6755 6760 6765

Gly Ser Pro Ser Asp Glu Asp Phe Asp Phe Glu Ser Ala Ser Asp Asp
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Glu Val Phe Asp Leu Leu Asp Asn Glu Leu Gly Leu Ser
 785 6790 6795

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<212> DNA

<213> Streptomyces natalensis

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 Met Phe Glu Asn Gln His Leu Ser Arg Arg Arg Leu Leu Gly Leu Ala
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 gcc ctc ggc ggc gcc gca gcc gga atg acc acg atc acc tcc gcc 96
 Ala Leu Gly Gly Ala Ala Ala Gly Met Thr Thr Ile Thr Ser Ala
 20 25 30
 cct cat gcc ggc gcc gca gac cgg cgc agt ccg cag gcc cgc agc ggc 144
 Pro His Ala Ala Ala Ala Asp Arg Arg Ser Pro Gln Ala Arg Ser Gly
 35 40 45
 tcg ttc gta ccg gcc gtg gtg atc ggt acg gga tac ggc gcc gcg gtc 192
 Ser Phe Val Pro Ala Val Val Ile Gly Thr Gly Tyr Gly Ala Ala Val
 50 55 60
 tcc gcg ctg cgg ctc ggc gag gcc gga att ccc acg ctc atg ctc gaa 240
 Ser Ala Leu Arg Leu Gly Glu Ala Gly Ile Pro Thr Leu Met Leu Glu
 65 70 75 80
 atg ggc cag ctg tgg aac aag ccc gcc gac gac ggc aac gtc ttc tgc 288
 Met Gly Gln Leu Trp Asn Lys Pro Ala Asp Asp Gly Asn Val Phe Cys
 85 90 95
 gga atg ctc tcg ccc gac cgc cgc tcc agc tgg ttc aag tcc cgc acc 336
 Gly Met Leu Ser Pro Asp Arg Arg Ser Ser Trp Phe Lys Ser Arg Thr
 100 105 110
 gag gcc ccg ctc ggc tcg ttc ctg tgg gat gtg atc aac cgc gac 384
 Glu Ala Pro Leu Gly Ser Phe Leu Trp Leu Asp Val Ile Asn Arg Asp
 115 120 125
 atc gac ccg tac gcg gga gtg ctg gac aag gtg cac ttc gac cag atg 432
 Ile Asp Pro Tyr Ala Gly Val Leu Asp Lys Val His Phe Asp Gln Met
 130 135 140
 tcg gtg tac gtg ggg cgg ggt gtc ggc ggc tcc ctg gtc aac ggc 480
 Ser Val Tyr Val Gly Arg Gly Val Gly Gly Ser Leu Val Asn Gly
 145 150 155 160
 ggg atg gcc gtc gta ccg aag cgc tcg tac ttc gag gag gtc ctc ccg 528
 Gly Met Ala Val Val Pro Lys Arg Ser Tyr Phe Glu Glu Val Leu Pro
 165 170 175
 cgg gtg gac gcc gcc gag atg tac gac cgg tac ttc ccg cgc gcc aac 576
 Arg Val Asp Ala Ala Glu Met Tyr Asp Arg Tyr Phe Pro Arg Ala Asn
 180 185 190
 tcc atg ctc aag gtg aac cac atc gac aag ggg tgg ttc gag gag acg 624
 Ser Met Leu Lys Val Asn His Ile Asp Lys Gly Trp Phe Glu Glu Thr
 195 200 205
 gag tgg tac aag ttc gcg cgg gtc tcg cgc gag cag gcg ggc aag gcg 672
 Glu Trp Tyr Lys Phe Ala Arg Val Ser Arg Glu Gln Ala Gly Lys Ala

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ggc ctg ggc acc acc ttc gtc ccc aac gtc tac gac ttc gac tac atg Gly Leu Gly Thr Thr Phe Val Pro Asn Val Tyr Asp Phe Asp Tyr Met	225	230	720
	235	240	
cg g cgc gag g c aac ggt gag tcg ccc aag tcc g c g c ctg g c g c acc gag Arg Arg Glu Ala Asn Gly Glu Ser Pro Lys Ser Ala Leu Ala Thr Glu	245	250	768
		255	
gtc atc tac ggc aac aac cac ggc aaa cag agc ctg gac aag acc tac Val Ile Tyr Gly Asn Asn His Gly Lys Gln Ser Leu Asp Lys Thr Tyr	260	265	816
		270	
ctg gcc g c g c ctc g c acc g c aag gtc acc atc gag acc ctg cac Leu Ala Ala Ala Leu Gly Thr Gly Lys Val Thr Ile Glu Thr Leu His	275	280	864
		285	
cag gtc agg g c atc cac cag cag cc g gac g c agc tac gtg ctg tcc Gln Val Arg Ala Ile His Gln Gln Pro Asp Gly Ser Tyr Val Leu Ser	290	295	912
		300	
gtg gac c a g atc gac a c g c g c c a g acc g c g c cac a a g a g a atc Val Asp Gln Ile Asp Thr Ala Gly Gln Thr Val Ala His Lys Glu Ile	305	310	960
		315	
		320	
tcc tgc cgt cac ctg ttc ctc ggc g c g c agc ctc ggc tcc acc gaa Ser Cys Arg His Leu Phe Leu Gly Ala Gly Ser Leu Gly Ser Thr Glu	325	330	1008
		335	
ctg ctg gtg cgc g c c g gac acc g c g c ctg ccc gac ctc aac g c Leu Leu Val Arg Ala Arg Asp Thr Gly Ala Leu Pro Asp Leu Asn Ala	340	345	1056
		350	
gag gtc ggc g c g c tgg ggc ccc aac g c aac atc atg acc g c c g Glu Val Gly Ala Gly Trp Gly Pro Asn Gly Asn Ile Met Thr Gly Arg	355	360	1104
		365	
gcc aac cac gtc tgg aac ccc acc ggg g c cac cag tcc tcg atc ccc Ala Asn His Val Trp Asn Pro Thr Gly Ala His Gln Ser Ser Ile Pro	370	375	1152
		380	
gct ctg g c atc gac gac tgg aac aac ccc acc g c cc g g c ttc g c Ala Leu Gly Ile Asp Asp Trp Asn Asn Pro Thr Ala Pro Val Phe Ala	385	390	1200
		395	
		400	
gaa atc g c cc g atg ccc g c g c ttg gag acc tgg g c agc ctc tat Glu Ile Ala Pro Met Pro Ala Gly Leu Glu Thr Trp Val Ser Leu Tyr	405	410	1248
		415	
ctg g c atc acc aag aac ccc gag c g g c acc ttc g c tac gac aag Leu Ala Ile Thr Lys Asn Pro Glu Arg Gly Thr Phe Val Tyr Asp Lys	420	425	1296
		430	
gcc acc gac c g g c g c ctg c g tgg ac g c g gac c a aac a c ccc Ala Thr Asp Arg Ala Ala Leu Arg Trp Thr Arg Asp Gln Asn Thr Pro	435	440	1344
		445	
g c g c aac g c g c g c agg t c c t c t g c a c a a g c a a Ala Val Asn Ala Ala Arg Ser Leu Phe Asp Arg Ile Asn Lys Ala Asn	450	455	1392
		460	

ggc acg atg tac cgc tac gac ctg ttc ggg ccg cag ctg aag aac ttc	1440
Gly Thr Met Tyr Arg Tyr Asp Leu Phe Gly Pro Gln Leu Lys Asn Phe	
465 470 475 480	
tcc gac gac ttc tgc tac cac ccg ctc ggc ggc tgc gtc ctg ggc aag	1488
Ser Asp Asp Phe Cys Tyr His Pro Leu Gly Gly Cys Val Leu Gly Lys	
485 490 495	
gcc acc gac ggg tac ggc cgg gtc gcc ggc tac cac aac ctc tac gtc	1536
Ala Thr Asp Gly Tyr Gly Arg Val Ala Gly Tyr His Asn Leu Tyr Val	
500 505 510	
acg gac ggc gcg ctc atc ccg ggg tcc atc ggg gtc aac ccc ttc gtg	1584
Thr Asp Gly Ala Leu Ile Pro Gly Ser Ile Gly Val Asn Pro Phe Val	
515 520 525	
acc atc acg gcg ctg gcc gag cgg aac atc gag cgg atc atc gcg gag	1632
Thr Ile Thr Ala Leu Ala Glu Arg Asn Ile Glu Arg Ile Ile Ala Glu	
530 535 540	
gac gtc aag gcc gcc tag	1650
Asp Val Lys Ala Ala	
545 550	

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 <212> PRT
 <213> Streptomyces natalensis

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Pro His Ala Ala Ala Ala Asp Arg Arg Ser Pro Gln Ala Arg Ser Gly	
35 40 45	
Ser Phe Val Pro Ala Val Val Ile Gly Thr Gly Tyr Gly Ala Ala Val	
50 55 60	
Ser Ala Leu Arg Leu Gly Glu Ala Gly Ile Pro Thr Leu Met Leu Glu	
65 70 75 80	
Met Gly Gln Leu Trp Asn Lys Pro Ala Asp Asp Gly Asn Val Phe Cys	
85 90 95	
Gly Met Leu Ser Pro Asp Arg Arg Ser Ser Trp Phe Lys Ser Arg Thr	
100 105 110	
Glu Ala Pro Leu Gly Ser Phe Leu Trp Leu Asp Val Ile Asn Arg Asp	
115 120 125	
Ile Asp Pro Tyr Ala Gly Val Leu Asp Lys Val His Phe Asp Gln Met	
130 135 140	
Ser Val Tyr Val Gly Arg Gly Val Gly Gly Ser Leu Val Asn Gly	
145 150 155 160	

Gly Met Ala Val Val Pro Lys Arg Ser Tyr Phe Glu Glu Val Leu Pro
 165 170 175
 Arg Val Asp Ala Ala Glu Met Tyr Asp Arg Tyr Phe Pro Arg Ala Asn
 180 185 190
 Ser Met Leu Lys Val Asn His Ile Asp Lys Gly Trp Phe Glu Glu Thr
 195 200 205
 Glu Trp Tyr Lys Phe Ala Arg Val Ser Arg Glu Gln Ala Gly Lys Ala
 210 215 220
 Gly Leu Gly Thr Thr Phe Val Pro Asn Val Tyr Asp Phe Asp Tyr Met
 225 230 235 240
 Arg Arg Glu Ala Asn Gly Glu Ser Pro Lys Ser Ala Leu Ala Thr Glu
 245 250 255
 Val Ile Tyr Gly Asn Asn His Gly Lys Gln Ser Leu Asp Lys Thr Tyr
 260 265 270
 Leu Ala Ala Ala Leu Gly Thr Gly Lys Val Thr Ile Glu Thr Leu His
 275 280 285
 Gln Val Arg Ala Ile His Gln Gln Pro Asp Gly Ser Tyr Val Leu Ser
 290 295 300
 Val Asp Gln Ile Asp Thr Ala Gly Gln Thr Val Ala His Lys Glu Ile
 305 310 315 320
 Ser Cys Arg His Leu Phe Leu Gly Ala Gly Ser Leu Gly Ser Thr Glu
 325 330 335
 Leu Leu Val Arg Ala Arg Asp Thr Gly Ala Leu Pro Asp Leu Asn Ala
 340 345 350
 Glu Val Gly Ala Gly Trp Gly Pro Asn Gly Asn Ile Met Thr Gly Arg
 355 360 365
 Ala Asn His Val Trp Asn Pro Thr Gly Ala His Gln Ser Ser Ile Pro
 370 375 380
 Ala Leu Gly Ile Asp Asp Trp Asn Asn Pro Thr Ala Pro Val Phe Ala
 385 390 395 400
 Glu Ile Ala Pro Met Pro Ala Gly Leu Glu Thr Trp Val Ser Leu Tyr
 405 410 415
 Leu Ala Ile Thr Lys Asn Pro Glu Arg Gly Thr Phe Val Tyr Asp Lys
 420 425 430
 Ala Thr Asp Arg Ala Ala Leu Arg Trp Thr Arg Asp Gln Asn Thr Pro
 435 440 445
 Ala Val Asn Ala Ala Arg Ser Leu Phe Asp Arg Ile Asn Lys Ala Asn
 450 455 460
 Gly Thr Met Tyr Arg Tyr Asp Leu Phe Gly Pro Gln Leu Lys Asn Phe
 465 470 475 480

Ser Asp Asp Phe Cys Tyr His Pro Leu Gly Gly Cys Val Leu Gly Lys
 485 490 495

Ala Thr Asp Gly Tyr Gly Arg Val Ala Gly Tyr His Asn Leu Tyr Val
 500 505 510

Thr Asp Gly Ala Leu Ile Pro Gly Ser Ile Gly Val Asn Pro Phe Val
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Thr Ile Thr Ala Leu Ala Glu Arg Asn Ile Glu Arg Ile Ile Ala Glu
 530 535 540

Asp Val Lys Ala Ala
 545 550

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<211> 1197

<212> DNA

<213> Streptomyces natalensis

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<223> ORF2

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 Asp Phe Pro Gln Arg Lys Pro Gly Val Pro Phe Pro Pro Asp Tyr
 20 25 30

gcc gac tac cgc gac ccg aag ggg ctc gtc ctc tcg cag ctg tcc gac 144
 Ala Asp Tyr Arg Asp Arg Lys Gly Leu Val Ser Gln Leu Ser Asp
 35 40 45

ggc aaa ccg gta tgg ctg gtc acc ccg cac gag gac gta cgc gcc gta 192
 Gly Lys Arg Val Trp Leu Val Thr Arg His Glu Asp Val Arg Ala Val
 50 55 60

ctg acc agc ccg agc atc agc tcg aac ccc gag cac aag gga ttt ccc 240
 Leu Thr Ser Pro Ser Ile Ser Ser Asn Pro Glu His Lys Gly Phe Pro
 65 70 75 80

aac gtc ggg aac ctg ggt gtg ccc aag cag gac cac atc ccg ggc tgg 288
 Asn Val Gly Asn Leu Gly Val Pro Lys Gln Asp Gln Ile Pro Gly Trp
 85 90 95

ttc gtg ggc atg gac tcc ccc gag cac gac ccg ttc cgc aag gcc ctc 336
 Phe Val Gly Met Asp Ser Pro Glu His Asp Arg Phe Arg Lys Ala Leu
 100 105 110

atc ccg gag ttc acc gtc ccg cgg gta cgc gcg atg aag ccc gcg atc 384
 Ile Pro Glu Phe Thr Val Arg Arg Val Arg Ala Met Lys Pro Ala Ile
 115 120 125

gaa cgc acg gtg gac gcc caa ctg gac gcc atg ctg gcc gcg ggc aac 432
 Glu Arg Thr Val Asp Ala Gln Leu Asp Ala Met Leu Ala Ala Gly Asn

130	135	140	
acc gcc gac ctc gtc gcc gac ttc gcc ctg ccc atc ccc tcc ctg gtg Thr Ala Asp Leu Val Ala Asp Phe Ala Leu Pro Ile Pro Ser Leu Val			480
145	150	155	160
atc tcc gca ctg ctc ggc gtg ccg ccc gcc gac cgc gag ttc ttc gag Ile Ser Ala Leu Leu Gly Val Pro Pro Ala Asp Arg Glu Phe Phe Glu			528
165	170	175	
tcc agg acc cgc gtc ctg gtc tcc ctc cgc tcc acc gac gac gac Ser Arg Thr Arg Val Leu Val Ser Leu Arg Ser Ser Thr Asp Asp Asp			576
180	185	190	
cgg atg gcc gcc gcc aag gac ctc ctg cgg tac atc aac cgg ctc gtg Arg Met Ala Ala Ala Lys Asp Leu Leu Arg Tyr Ile Asn Arg Leu Val			624
195	200	205	
gag atc aaa cag aag tgg ggc ggc gac gac ctc atc acc cgg ctg ctg Glu Ile Lys Gln Lys Trp Gly Gly Asp Asp Leu Ile Thr Arg Leu Leu			672
210	215	220	
gcc acc ggt gcc atc gcc ccc cac gaa atg tcc ggc gtg ctg atg ctc Ala Thr Gly Ala Ile Ala Pro His Glu Met Ser Gly Val Leu Met Leu			720
225	230	235	240
ctg ctc atc gcc ggc cac gag acc acg gcc aac aac atc gcc ctc ggc Leu Leu Ile Ala Gly His Glu Thr Thr Ala Asn Asn Ile Ala Leu Gly			768
245	250	255	
gtg gtc acc ctg ctg gcg aac ccc caa tgg atc ggc gac gac cgg gcc Val Val Thr Leu Leu Ala Asn Pro Gln Trp Ile Gly Asp Asp Arg Ala			816
260	265	270	
gtg gag gag acc ctg cgc ttc cac tcc gtc gcc gac ctg gtg tcc ctg Val Glu Glu Thr Leu Arg Phe His Ser Val Ala Asp Leu Val Ser Leu			864
275	280	285	
cgc gtc gcg gtc cag gac gtg gaa atc gcc ggg cag ctc atc aag gcg Arg Val Ala Val Gln Asp Val Glu Ile Ala Gly Gln Leu Ile Lys Ala			912
290	295	300	
ggc gag gga atc gtg ccg ctg gtc gcc gcc gac aat cat gac gag aac Gly Glu Gly Ile Val Pro Leu Val Ala Ala Asn His Asp Glu Asn			960
305	310	315	320
gcc ttc gaa tgc ccc cac gcc ttc gac ccg tcc cgg tcc gcc cgc cac Ala Phe Glu Cys Pro His Ala Phe Asp Pro Ser Arg Ser Ala Arg His			1008
325	330	335	
cat gtg gcc ttc ggc tac ggc gta cac caa tgc ctg gga cag aac ctg His Val Ala Phe Gly Tyr Gly Val His Gln Cys Leu Gly Gln Asn Leu			1056
340	345	350	
gtg cgg atc gag atg gaa gtc gcg tac cgg aaa ctc ttc gag cgc atc Val Arg Ile Glu Met Glu Val Ala Tyr Arg Lys Leu Phe Glu Arg Ile			1104
355	360	365	
ccg aac ctc gaa ctc gcc gtg ccc acc gac ggg ttg gac atc aag tac Pro Asn Leu Glu Leu Ala Val Pro Thr Asp Gly Leu Asp Ile Lys Tyr			1152
370	375	380	

gac ggc gtg ctc tac ggc ctg aac gag ctg ccc gtc cgc tgg tag 1197
 Asp Gly Val Leu Tyr Gly Leu Asn Glu Leu Pro Val Arg Trp
 385 390 395

<210> 8
 <211> 399
 <212> PRT
 <213> Streptomyces natalensis

<400> 8
 Met Thr Tyr Thr Asp Pro Ala Ala Pro Glu Thr Asp Pro Pro Ala Val
 1 5 10 15

Asp Phe Pro Gln Arg Lys Pro Gly Val Pro Phe Pro Pro Pro Asp Tyr
 20 25 30

Ala Asp Tyr Arg Asp Arg Lys Gly Leu Val Leu Ser Gln Leu Ser Asp
 35 40 45

Gly Lys Arg Val Trp Leu Val Thr Arg His Glu Asp Val Arg Ala Val
 50 55 60

Leu Thr Ser Pro Ser Ile Ser Ser Asn Pro Glu His Lys Gly Phe Pro
 65 70 75 80

Asn Val Gly Asn Leu Gly Val Pro Lys Gln Asp Gln Ile Pro Gly Trp
 85 90 95

Phe Val Gly Met Asp Ser Pro Glu His Asp Arg Phe Arg Lys Ala Leu
 100 105 110

Ile Pro Glu Phe Thr Val Arg Arg Val Arg Ala Met Lys Pro Ala Ile
 115 120 125

Glu Arg Thr Val Asp Ala Gln Leu Asp Ala Met Leu Ala Ala Gly Asn
 130 135 140

Thr Ala Asp Leu Val Ala Asp Phe Ala Leu Pro Ile Pro Ser Leu Val
 145 150 155 160

Ile Ser Ala Leu Leu Gly Val Pro Pro Ala Asp Arg Glu Phe Phe Glu
 165 170 175

Ser Arg Thr Arg Val Leu Val Ser Leu Arg Ser Ser Thr Asp Asp Asp
 180 185 190

Arg Met Ala Ala Ala Lys Asp Leu Leu Arg Tyr Ile Asn Arg Leu Val
 195 200 205

Glu Ile Lys Gln Lys Trp Gly Gly Asp Asp Leu Ile Thr Arg Leu Leu
 210 215 220

Ala Thr Gly Ala Ile Ala Pro His Glu Met Ser Gly Val Leu Met Leu
 225 230 235 240

Leu Leu Ile Ala Gly His Glu Thr Thr Ala Asn Asn Ile Ala Leu Gly
 245 250 255

Val Val Thr Leu Leu Ala Asn Pro Gln Trp Ile Gly Asp Asp Arg Ala

260

265

270

Val Glu Glu Thr Leu Arg Phe His Ser Val Ala Asp Leu Val Ser Leu
 275 280 285

Arg Val Ala Val Gln Asp Val Glu Ile Ala Gly Gln Leu Ile Lys Ala
 290 295 300

Gly Glu Gly Ile Val Pro Leu Val Ala Ala Asn His Asp Glu Asn
 305 310 315 320

Ala Phe Glu Cys Pro His Ala Phe Asp Pro Ser Arg Ser Ala Arg His
 325 330 335

His Val Ala Phe Gly Tyr Gly Val His Gln Cys Leu Gly Gln Asn Leu
 340 345 350

Val Arg Ile Glu Met Glu Val Ala Tyr Arg Lys Leu Phe Glu Arg Ile
 355 360 365

Pro Asn Leu Glu Leu Ala Val Pro Thr Asp Gly Leu Asp Ile Lys Tyr
 370 375 380

Asp Gly Val Leu Tyr Gly Leu Asn Glu Leu Pro Val Arg Trp
 385 390 395

<210> 9

<211> 1194

<212> DNA

<213> Streptomyces natalensis

<220>

<221> CDS

<222> (1)..(1194)

<223> ORF3

<400> 9

atg acc gcc gcc tcc cac gac ctg ccc tgc ctc aac ctc gaa ccg ccc 48
 Met Thr Ala Ala Ser His Asp Leu Pro Cys Leu Asn Leu Glu Pro Pro
 1 5 10 15

aaa atg ctg aaa ctg agc ccg ctg ctc cgc gcc ttg cag gac ccg ggg 96
 Lys Met Leu Lys Leu Ser Pro Leu Leu Arg Ala Leu Gln Asp Arg Gly
 20 25 30

ccg atc cac ccg gtg cgc aca ccc gcc ggg gac gag gcg tgg ctg gtg 144
 Pro Ile His Arg Val Arg Thr Pro Ala Gly Asp Glu Ala Trp Leu Val
 35 40 45

acc cgc cac gcc gag ctc aag cag ctg ctg cac gac gag cgc atc ggc 192
 Thr Arg His Ala Glu Leu Lys Gln Leu Leu His Asp Glu Arg Ile Gly
 50 55 60

cgc acg cac ccc gac ccg ccc tcc gcc gcc cag tac gta cgc agc ccc 240
 Arg Thr His Pro Asp Pro Pro Ser Ala Ala Gln Tyr Val Arg Ser Pro
 65 70 75 80

ttc ctg gac ctg ctg atc agc gac gcc gac gcc gag tcc ggg cgt ccg 288
 Phe Leu Asp Leu Leu Ile Ser Asp Ala Asp Ala Glu Ser Gly Arg Arg
 85 90 95

cag cac gcc gag acc cgc cgc ctg ctc act ccg ttg ttc tcg gcc cgg Gln His Ala Glu Thr Arg Arg Leu Leu Thr Pro Leu Phe Ser Ala Arg 100 105 110	336
cgc gtt ctg gaa atg cag ccg aag gtg gag gag gcc gcg gac acc ctg Arg Val Leu Glu Met Gln Pro Lys Val Glu Glu Ala Ala Asp Thr Leu 115 120 125	384
ctg gac gcg ttc atc gcc cag ggg cct ccc ggc gac ctg cac ggc gag Leu Asp Ala Phe Ile Ala Gln Gly Pro Pro Gly Asp Leu His Gly Glu 130 135 140	432
ctc acc gtg ccg ttc gcc ctc acg gtc ctc tgc gag gtc atc ggc gtg Leu Thr Val Pro Phe Ala Leu Thr Val Leu Cys Glu Val Ile Gly Val 145 150 155 160	480
ccg ccg cag cgc cgc gcg gag ctg acc aca ctg ctg gcc ggt atc gcc Pro Pro Gln Arg Arg Ala Glu Leu Thr Thr Leu Leu Ala Gly Ile Ala 165 170 175	528
aag ctg gac gac cgc gag ggc gca gta cgg gca cag gac gac ctg ttc Lys Leu Asp Asp Arg Glu Gly Ala Val Arg Ala Gln Asp Asp Leu Phe 180 185 190	576
ggg tac gtg gca ggg ctg gtc gag cac aag cgg gcc gag ccc ggc cca Gly Tyr Val Ala Gly Leu Val Glu His Lys Arg Ala Glu Pro Gly Pro 195 200 205	624
gac atc atc tcc cgg ctg aac gac ggc gag ctg acc gag gac cgc gtg Asp Ile Ile Ser Arg Leu Asn Asp Gly Glu Leu Thr Glu Asp Arg Val 210 215 220	672
gca cac ctg gcc atg ggc ctg ctg ttc gcc ggg ctg gac agc gtc gcg Ala His Leu Ala Met Gly Leu Leu Phe Ala Gly Leu Asp Ser Val Ala 225 230 235 240	720
agc atc atg gac aac ggg gtg gtg ctg ctg gcc gcc cac ccc gat cag Ser Ile Met Asp Asn Gly Val Val Leu Leu Ala Ala His Pro Asp Gln 245 250 255	768
cgc gcg gcg ctg gcc gac ccc gac gtg atg gcg cgt gcc gtg gag Arg Ala Ala Ala Leu Ala Asp Pro Asp Val Met Ala Arg Ala Val Glu 260 265 270	816
gag gtg ctg cgg acc gcc cgg gcc ggc ggg tgc gtc ctg ccc ccc cgc Glu Val Leu Arg Thr Ala Arg Ala Gly Gly Ser Val Leu Pro Pro Arg 275 280 285	864
tac gcc agc gag gac atg gaa ttc ggc ggg gtg acg ata cgg gcc gga Tyr Ala Ser Glu Asp Met Glu Phe Gly Gly Val Thr Ile Arg Ala Gly 290 295 300	912
gac ctg gtc ctg ttc gac ctc ggc ctg ccc aac ttc gac gag cgg gcg Asp Leu Val Leu Phe Asp Leu Gly Leu Pro Asn Phe Asp Glu Arg Ala 305 310 315 320	960
ttc aca ggg ccg gag gaa ttc gac gcc ggc agg acc ccc aat ccc cat Phe Thr Gly Pro Glu Glu Phe Asp Ala Ala Arg Thr Pro Asn Pro His 325 330 335	1008

ctg acc ttc ggc cac ggc atc tgg cac tgc atc ggc gcc ccc ctc gcg 1056
 Leu Thr Phe Gly His Gly Ile Trp His Cys Ile Gly Ala Pro Leu Ala
 340 345 350

cgc ctg gaa ctc agg acg atg ttc acc aag ctg ttc acc cgc ctg ccg 1104
 Arg Leu Glu Leu Arg Thr Met Phe Thr Lys Leu Phe Thr Arg Leu Pro
 355 360 365

gaa ctg cgc ccg gaa ctt ccg gtg gag caa ctg cgc ctg aag gag ggc 1152
 Glu Leu Arg Pro Glu Leu Pro Val Glu Gln Leu Arg Leu Lys Glu Gly
 370 375 380

cag ctg tcg ggc ggc ttc gcc gag ctc cgg gtg gtc tgg tag 1194
 Gln Leu Ser Gly Gly Phe Ala Glu Leu Arg Val Val Trp
 385 390 395

<210> 10
 <211> 398
 <212> PRT
 <213> *Streptomyces natalensis*

<400> 10
 Met Thr Ala Ala Ser His Asp Leu Pro Cys Leu Asn Leu Glu Pro Pro
 1 5 10 15

Lys Met Leu Lys Leu Ser Pro Leu Leu Arg Ala Leu Gln Asp Arg Gly
 20 25 30

Pro Ile His Arg Val Arg Thr Pro Ala Gly Asp Glu Ala Trp Leu Val
 35 40 45

Thr Arg His Ala Glu Leu Lys Gln Leu Leu His Asp Glu Arg Ile Gly
 50 55 60

Arg Thr His Pro Asp Pro Pro Ser Ala Ala Gln Tyr Val Arg Ser Pro
 65 70 75 80

Phe Leu Asp Leu Leu Ile Ser Asp Ala Asp Ala Glu Ser Gly Arg Arg
 85 90 95

Gln His Ala Glu Thr Arg Arg Leu Leu Thr Pro Leu Phe Ser Ala Arg
 100 105 110

Arg Val Leu Glu Met Gln Pro Lys Val Glu Glu Ala Ala Asp Thr Leu
 115 120 125

Leu Asp Ala Phe Ile Ala Gln Gly Pro Pro Gly Asp Leu His Gly Glu
 130 135 140

Leu Thr Val Pro Phe Ala Leu Thr Val Leu Cys Glu Val Ile Gly Val
 145 150 155 160

Pro Pro Gln Arg Arg Ala Glu Leu Thr Thr Leu Leu Ala Gly Ile Ala
 165 170 175

Lys Leu Asp Asp Arg Glu Gly Ala Val Arg Ala Gln Asp Asp Leu Phe
 180 185 190

Gly Tyr Val Ala Gly Leu Val Glu His Lys Arg Ala Glu Pro Gly Pro
 195 200 205

Asp Ile Ile Ser Arg Leu Asn Asp Gly Glu Leu Thr Glu Asp Arg Val
 210 215 220
 Ala His Leu Ala Met Gly Leu Leu Phe Ala Gly Leu Asp Ser Val Ala
 225 230 235 240
 Ser Ile Met Asp Asn Gly Val Val Leu Leu Ala Ala His Pro Asp Gln
 245 250 255
 Arg Ala Ala Ala Leu Ala Asp Pro Asp Val Met Ala Arg Ala Val Glu
 260 265 270
 Glu Val Leu Arg Thr Ala Arg Ala Gly Gly Ser Val Leu Pro Pro Arg
 275 280 285
 Tyr Ala Ser Glu Asp Met Glu Phe Gly Gly Val Thr Ile Arg Ala Gly
 290 295 300
 Asp Leu Val Leu Phe Asp Leu Gly Leu Pro Asn Phe Asp Glu Arg Ala
 305 310 315 320
 Phe Thr Gly Pro Glu Glu Phe Asp Ala Ala Arg Thr Pro Asn Pro His
 325 330 335
 Leu Thr Phe Gly His Gly Ile Trp His Cys Ile Gly Ala Pro Leu Ala
 340 345 350
 Arg Leu Glu Leu Arg Thr Met Phe Thr Lys Leu Phe Thr Arg Leu Pro
 355 360 365
 Glu Leu Arg Pro Glu Leu Pro Val Glu Gln Leu Arg Leu Lys Glu Gly
 370 375 380
 Gln Leu Ser Gly Gly Phe Ala Glu Leu Arg Val Val Trp
 385 390 395

<210> 11

<211> 40

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Forward primer
ermE promoter

<400> 11

aaactgcagc tctagaggcg gcttgcgccc gatgctagtc

40

<210> 12

<211> 70

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Reverse primer
ermE promoter

<400> 12

aaactgcagc tctagatggc ccgggtatcg atcgtcgacg gcatgcggat cctaccaacc 60

ggcacgattg 70

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<210> 13
<211> 30
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence; Forward primer ORF1

<400> 13

aggattaccc atatgttcga gaaccagcat 30

:

<210> 14
<211> 20
<212> DNA
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence; Reverse primer ORF1

<400> 14

gcatgagcgt gggattccg 20

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